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Introduction

In 2021, the inaugural Yidan Prize Doctoral Conference was launched as a precursor to the Yidan Prize Conference Series: Europe. On 27 May, 20 students from around the world presented their doctoral research. Our theme for this doctoral conference was ‘What is the future of education’. Doctoral students are part of that future along with early career researchers as vital and pivotal members of the academic and research community. They are the future leaders in education. Doctoral students and early career researchers’ ideas are cutting edge, and their enthusiasm infectious; a constant source of inspiration! We plan for this conference to be the start of a new community of scholars, connected globally as their research grapples with what the future of education should look like.

Bringing the conference together under the theme were our keynote speakers. Professor Rebecca Eynon from the University of Oxford is a Professor of Education, the Internet and Society, where she holds a joint appointment between the Department of Education and the Oxford Internet Institute (OII). She is a sociologist of education, specializing in the relationships between social inequalities, learning and technology. Professor Eynon’s current research examines the ethical and social implications of the use of digital trace data in education. Her keynote titled, the datafication of education: designing for alternative futures, highlighted the implications for schools and the way we think about education when there is heavy reliance on the use of data in education. She emphasized that there is much potential; it can inform us about student and teacher progress, resource allocation and systems information in terms of timetabling and accountability procedures. Yet, we need to be cautious not least because of the social and educational inequality implications. Professor Eynon reminded us that data is not neutral stating, ‘n ≠ all and favors certain groups’ and asks how these technologies are changing the relationship between teacher and student and compounding inequalities.

However, there is a need to engage with data despite the challenges because if we do not then others will; it is a complement to other forms of data to support agency for students and teachers:

We are very good at arguing with google maps when it takes us the wrong direction so why can’t we argue with data in education in a similar way?

Ms Lucy Lake and Ms Angeline (Angie) Murimirwa from CAMFED (the Campaign for Female education) is the first team to win the Yidan Prize for Education Development (in 2020). CAMFED is a pan-African movement revolutionizing how girls’ education is delivered. Through a gold-standard system of accountability to the young people and communities they serve, they have created a model that radically improves girls’ prospects of becoming independent, influential women. Lucy is the Chief Executive Officer of CAMFED and has pioneered strategies to increase school retention and learning among marginalized girls, benefiting over six million young people. Angie, once a CAMFED student, is currently CAMFED’s Executive Director - Africa. She is uniquely positioned to bring the expertise of young women once excluded from education to inform policy and strategy at every level. In their summary and concluding comments keynote of the doctoral conference, Angie spoke about exclusion in education especially in the context she understands best – Africa. Education is not delivered in isolation, there are many factors contributing to exclusion from school and within school. Poverty and academic low self-esteem are two of the biggest factors of school exclusion. Angie discussed the ‘Learner Guide program’, developed and aimed to help young people engage through psychosocial support and mentoring to children to improve their learning outcomes. Girls through CAMFED are three times less likely to drop out of school.
Lucy further explored the Learner Guide program explaining it as a bridge to support learning and to make sure young people felt it was relevant to their lives and experiences. A key feature is the definition of expert. Who in this instance is the expert?

CAMFED focused on young people and wove their insights and experiences into the curriculum development; they formed the editorial committee. The power dynamics were considered at all levels from development to delivery in the Learner Guide program. Deftly, Lucy made the audience think about power dynamics in educational research highlighting that if research is positioned wrong then it can perpetuate marginalization, exclusion, and disempowerment. She rightly asks at the doctoral conference; how can we be cognizant of and address the power imbalance inherent in so much research and practice in international education? We need to rebalance the concept of expert and the understanding of where expertise lies and center young people’s voices in any discussion on their educational outcomes. Lucy and Angie’s advice to the audience was:

You have an opportunity to be disruptive. Look for new ways of doing things and be bold while you are doing that because it is not a path well-travelled to take it easy and there are no clear signposts so you need to defend that ... in terms of engaging marginalized people, be respectful and treat them as you want to be treated and go beyond the surface answers you get because it is an issue of power and a chance of not even ownership of your own story as a marginalized person, and ask why, why, why!

Equity and joining up systems – education, health, justice – is incredibly important if we are to face the challenges in society. The messages form Lucy and Angie’s keynote resonated with the presentations from our doctoral speakers.

We received 50 submissions from all over the world representing some of the leading thoughts and young voices globally. Through a blind review process conducted by six leading academics in the Department of Education at the University of Oxford, 20 papers were chosen to be presented at the doctoral conference.¹

The work of doctoral students underpins educational research. The Vice-Chancellor, Professor Louise Richardson, noted in her opening address of the Yidan Prize European Conference that the doctoral conference was an important addition to the Yidan Prize Conference Series, which was created to inspire and recognize the world’s next generation of leading education researchers:

As a leading research intensive, multi-disciplinary university, we pride ourselves on supporting exactly this type of talent and are glad that the Yidan Prize Foundation shares this vision.

Dr Susan James Relly, Conference Compère
Associate Head (Education), Social Sciences Division
Associate Professor & Director of SKOPE,
Department of Education, University of Oxford

¹ This publication includes 16 out of the 20 papers.
Blended, remote and deep: Redesigning learning in low-resource rural primary schools

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Abstract

The coronavirus pandemic has put a stark light on an emerging truth—that we need to move beyond treating technology as a means by which to simply automate conventional models of teaching; rather, it now appears to be more important than ever that we focus our attention on ways in which we can leverage educational technology for the design of online and hybrid learning environments that promote deep, holistic learning across subjects and grade levels. This doctoral study investigated the effectiveness of a hybrid remote model designed for the delivery of the English language national curriculum to primary school-age children in geographically and socioeconomically isolated areas in Greece which suffer from a lack of teachers and, as a result, have traditionally been excluded from accessing core learning domains. Drawing on Tochon's (2019) deep language learning framework, the study examined the role which deeper forms of engagement and understanding, such as creativity, curiosity, prosocial behavior, and effective collaboration skills, played in a blended remote learning environment which fundamentally centers around three key concepts: computer-supported collaborative enquiry, authenticity, and self-paced mastery. Using a mixed methods quasi-experimental design, the research analyzed attainment data from 47 pupils aged 8-12 attending eight small rural schools across the country. Qualitative insights were drawn through focus group and interview responses to establish students', teachers' and parents' views on the impact of the intervention on students and their environment, as well as the specific mechanisms by which this impact was perceived to have operated.

The blended remote intervention was found to have a significant impact on children's second language development in four out of five language domains assessed. Furthermore, findings indicate children to regard meaningful peer collaboration, personalization, and opportunities to explore, discover, and leverage imagination and creativity as salient factors in their positive attitudes towards learning in a hybrid environment. A key question that emerged concerned issues pertaining to alternative forms of assessment, such as including levels of teamwork, cooperation competency and initiative competency into cross-disciplinary curricular aims to serve as markers of successful group task completion. It is therefore argued that taking care to design blended remote learning approaches that are better aligned to an overall vision for second language education that is underpinned by principles of deep learning is likely to offer a vehicle for accelerating opportunities not only for children's second language attainment but also their inter- and intrapersonal development. Such principles could be adopted as a quality benchmark in improving children's learning chances, including those in hard-to-reach and marginalized settings.

Keywords

EFL; ESL; second language learning; deep learning; blended; remote learning; rural primary schools; Greece
Introduction

Small schools have traditionally been championed for the value they bring to their typically rural communities. Yet pupils in hundreds of small rural primary schools in remote parts of Greece have for decades been excluded from core areas of the national curriculum, including English as a foreign language (EFL), IT/Computing, PE, Music and Art, due to the higher per-pupil costs involved in staffing these schools with qualified teachers (OECD, 2018). The lack of state provision for access to these learning domains effectively means that rural children are unable to compete with their urban counterparts who, by the time they complete compulsory education will have received six years’ worth of additional instruction in these subjects. Inequalities are further exacerbated by the fact that rural families who can afford to, seek out private alternatives to compensate for the gap in state provision, whereas those who are less able to afford private tuition are left behind (OECD, 2018).

This research addresses calls in the recent literature to examine the potential of information and communication technologies (ICT) and other forms of ICT-supported learning for expanding educational access and broadening curricula through distance education, thereby alleviating the difficulties faced by remote rural schools in Greece (e.g., see OECD, 2018). Despite a burgeoning field of research into the effectiveness of blended learning (BL) approaches (defined as a combination of face-to-face and asynchronous online learning) in terms of academic achievement, most of this has been carried out in the context of higher education (e.g., Boelens et al., 2018; Medina, 2018; Castro, 2019) and, while there are some studies which have investigated blended approaches in relation to K-12 learning, these have mostly concentrated on secondary education (Barbour, 2014; Waters et al., 2014). As such, much less is known about the practical feasibility and the parameters that might facilitate or impede academic success in a blended learning environment involving primary school children. Furthermore, there has been little systematic attention to the effectiveness of such educational interventions in low-income and resource-scarce settings, not least in the context of Greece (Anastasiou et al., 2015).

There is also a growing body of research into blended language learning which lends support to the argument that hybrid approaches may indeed, under certain circumstances, support second language attainment (e.g., Shih, 2010; Barani, 2011; Adas & Bakir, 2013; Ghazizadeh & Fatemipour, 2017). However, the majority of these studies focus on university students or have been carried out in private language institutes where the majority of learners are adults. It thus becomes apparent that although the demand for BL has increased, our understanding of effective BL implementation that eliminates rather than exacerbates existing inequities, is at present rather fragmented — especially in relation to K-12 settings.

Yet more recent conceptualizations of blended learning go beyond this notion of accessibility. In addition to flexibility in terms of time and place, BL also affords opportunities to cater to students’ individual needs and, thus, achieve a greater degree of personalization in teaching (Boelens et al., 2018). Speaking to the same idea, Roschelle et al., draw an important distinction between using technology to do conventional things better versus using technology to do better things (cited in Fishman & Dede, 2016, p. 1269; emphasis in the original). The authors argue that we need to move beyond treating technology as a means by which to simply automate conventional models of teaching; the real value in technology lies in its ability to act as a catalyst for a shift towards an “alternative, next-generation educational model” (p. 1271). For Fishman and Dede, this transformation entails swinging the pendulum in the direction of personalized, participatory, collaborative, guided learning, and deeper engagement, amongst others.

This is particularly important for small rural schools operating multigrade classrooms, where two or more grades are taught by a single teacher within the same classroom context. In such learning environments, multigrade teachers are faced with the additional demand of having to simultaneously address the needs of children of different educational levels, ages and interests, while following more than one curriculum within any given period. Indeed, this might be one of the reasons rural schools are often thought to provide a second-class education. Hargreaves et al. (2009, p. 82) consider the view that rural schools’ educational provision is “inferior to that provided in larger urban schools where there are more teachers and easier access to resources for teaching and learning” as grounds for pursuing research in rural schools. In the local context, for instance, Year 3 pupils may be taught alongside their Year 4 peers the syllabus of the latter for an entire year. The same pupils would then go on to study the syllabus of Years 3 and 6, respectively, the following year. While exposure to work at different grade levels may benefit some learners by reinforcing and extending their learning opportunities (Berry, 2006), it is nonetheless likely that such a high level of heterogeneity will cause undue cognitive strain on others, possibly even leading to isolation and marginalization.
The present study is therefore an attempt to contribute to an emerging body of research into blended educational formats that go beyond conventional models of online or hybrid teaching. In doing so, it addresses concerns that failure to account for the development of socio-affective capabilities such as emotional understanding, social competence, and identity development, there is the danger of teaching practices and school curricula leading to the rise of an increasingly impoverished inner identity with huge personal and social consequences (Tochon, 2019). The present intervention is thus rooted in a sociocultural understanding of development and the idea that subject matter and academic learning cannot in fact be separated from activities such as social identification and co-construction of understanding. Further, guided by this idea of using technology to do better things, I draw on Tochon's (2019) framework of deep language learning in reconceptualizing the second language classroom as a resource for mediating holistic development in students.

**Deep language learning**

A ‘deep’ approach to second language development represents a paradigm shift which provides viable options that show that authentic language learning is profoundly connected to shaping thinking and social actions. Indeed, it goes beyond the traditional view that language education must be confined to merely a show of linguistic performances, but rather provides a theoretical foundation for a language pedagogy that includes but goes beyond the acquisition of linguistic knowledge and skills: in deep learning, learners develop competencies that allow the articulation of agency and a more well-rounded type of development. This reframing entails viewing language learning in two novel ways: first, as an ‘expression of dynamic planning prototypes that can be activated through self-directed projects’; and second, as the integration of structure and agency intended for meeting ‘deeper, humane aims’ (Tochon, 2019, p. 24).

From a practical perspective, this is achieved by embracing pluralism: deep language learning constitutes a bricolage of existing instructional approaches and techniques all blended together on a solid theoretical foundation, while allowing room for diversity and flexibility, non-native speaker comfort, code-switching, and unique perspectives. Indeed, Tochon’s framework challenges the traditional view that language classes should be planned exclusively by the teacher and follow strict curricular guidelines. Instead, he maintains that unless the student is part of the planning process, no degree of syllabus adaptation will ever succeed in stimulating engagement and thus use the full resources of the learner ([ibid.], p. 40). This is because, in reality, it is not possible for teachers to find where the zone of proximal development for each student is. Rather, it is only students who have access to the full range of factors that shape their next level of interest and challenge; factors such as prior experience and knowledge, inclinations and dispositions, ways of knowing, topic preferences, etc. determine progression and flow learning (Csikszentmihalyi & Selega-Csikszentmihalyi, 1992). Instead, the teacher’s role is to ‘play with’ learner’s genuine intentions (used by Tochon in the place of ‘learning goals’ or ‘outcomes’) through tasks, domains, and levels of achievement whose focus will be to open the world of the child to the boundless possibilities for personalized exploration that the Internet age has made possible. The concept of deep schooling then stands in opposition to homogenized types of content and levels of achievement for all.

Pedagogically, ‘depth’ can be achieved by virtue of organizing open projects which integrate numerous tasks at the following three levels of interaction: (a) the thematic level of disciplinary content (i.e., grappling with content elements, such as using language for describing personality or expressing contrasts); (b) the instrumental level of interdisciplinary skills (e.g., researching and comparing physical and psychological characteristics to write personality profiles); and (c) the strategic, experiential level of general transdisciplinary action (e.g., gaining a deepened appreciation of the concepts of behavior and character traits; an increased understanding of problems of economic and social nature such as relationships, harmony and conflict, and marriage and divorce).

Indeed, the notion of transdisciplinary is a fundamental element of deep learning. Packer and Goicoechea (2000, p. 25) describe how academic learning is an ontological (rather than epistemological) human process through which ‘individuals create and transform themselves as they interact with others, sign systems and the world’. In this sense, we are constantly undergoing ontological change—no matter how small that may be—as we learn new things. Therefore, academic learning and social identification are understood as two distinct yet inextricably linked processes which become subsumed into a larger process involving personal (and, by extension, social) transformation. Ultimately, such bigger and broader transdisciplinary projects that meet higher values and aims such as deep culture, deep intra- and interpersonal competencies, and so forth, are precisely what lends meaning to language learning tasks.
The aims and contribution of the current study

In light of the theory and literature considered in this review, the principal aim of the current study was to expand upon the rather small number of existing empirical studies that have examined the effectiveness of blended remote learning in low-resource K-12 settings. One of the main advances of the current study is that it reconceptualizes language learning through a ‘deep’ lens involving disciplinary mastery; the nurturing of creativity and original thought through engagement with interdisciplinary, collaborative, real-world-aligned projects; and identity development through intrapersonal insight. It thereby expands on existing international provision by addressing a previously neglected factor: it demonstrates the importance of prioritizing pedagogical uses of technology that increase the breadth and depth of learning, together with practical examples of how these can be pursued in a hybrid learning environment which fundamentally centers around three key concepts: collaborative enquiry, authenticity, and self-paced mastery.

Another aim of the research was to shed light on the mechanisms underpinning the effectiveness of the hybrid intervention with primary children from a wide range of perspectives. Through mixing quantitative insights with findings from qualitative observations of children's use of the intervention, focus groups and semi-structured interviews with headteachers and parents, the present research aimed to elucidate how children's attributes and aspects of implementation (e.g., contextual factors at the classroom level or learning materials) may impact upon learning. Therefore, the research questions were formulated as follows:

*RQ1: What level of progress in EFL attainment is made by children who attend the blended remote model?*

*RQ2: What are the specific mechanisms which mediate and/or inhibit said progress in English language development?*

**Method**

**Research context and participants**

Data obtained for this study came from 47 pupils attending eight different small rural schools across the Greek mainland and the island of Crete (for a more detailed description of the participating schools and the selection criteria that were employed, see Lymperis, 2019). All the schools that received the intervention were mixed gender state primary schools operating with a maximum of two teachers each (including the headteacher, whose professional duties in these schools normally also involve teaching responsibilities). None of these schools had ever had any provision for the teaching of English. There was one computer only in each school, while an overhead projector was available in two school sites. The mean age of the participants was recorded in years and months at the start of the fieldwork testing (M = 10 years 5 months, min. = 8 years 7 months, max. = 12 years 3 months). The participants were in Years 6 (N = 18), 5 (N = 20), 4 (N = 5) and 3 (N = 4) during the fieldwork timeframe (academic year 2018-2019).

**Research procedures and instruments**

The study employed an embedded mixed-methods intervention design. Pre-tests and post-tests were administered to investigate the impact that the BL program had on children's EFL achievement. Five language measures were administered at the start and end of the fieldwork, each of which was mapped to the Common European Framework of Reference for Languages (CEFR), and was designed to assess five distinct levels (Pre-A1 to A2.2.) on a single, continuous scale which increased in difficulty. The linguistic dimensions assessed were as follows: vocabulary and grammar; aural comprehension; writing skills; and oral fluency.

All language instruments used were adapted versions of widely used international EFL assessment tests, such as the Cambridge English A2 KEY qualification assessment (Cambridge Assessment English, 2018). Two different types of measurement reliability were assessed for the tests administered in this study: (1) internal consistency was measured through Cronbach's alpha; and (2) interrater reliability was measured through the Kappa statistic test. Reliability coefficients for four out of five outcome measures ranged between 0.82 and 0.92, and were therefore deemed acceptable. An exception to this was the oral fluency measure, which produced changes in scores that had relatively low reliability (α = 0.59), possibly as a result of significant data loss that occurred at the post-test phase. This measure was excluded from further inferential analysis. Moreover, individual differences in children's cognitive ability were measured through the Raven's Colored Progressive Matrices Test (CPM; Styles et al., 1998), while child and parental background data was gathered through two separate surveys prior to the intervention.
Qualitative data collection was designed to enhance understandings of the elements of the intervention, the participants and the wider environment which supported the children in making learning improvements, or which otherwise impeded their progress, thereby addressing Research Question 2. Data were gathered from three sources: focus groups with the children \((N = 35)\), and semi-structured interviews with (a) headteachers and (b) parents from the participating schools \((N = 6)\).

All interviews were carried out remotely via teleconferencing software. Thematically, they sought to do the following: on the one hand, they aimed at eliciting comprehensive accounts of different aspects of the children's life worlds that delineated the qualitative diversity of their academic experiences; on the other hand, the interviews sought to obtain an extended understanding of the children's perceptions of the intervention, from the perspective of the parents and headteachers who had been actively involved in the learning process. It was hypothesized that such nuanced accounts would facilitate the identification of situational factors which may have contributed to or impeded the students' academic achievement during the program. The data were analyzed using thematic analysis, combined with constant comparison techniques from grounded theory (Glaser & Strauss, 1967).

The intervention

The intervention itself was conducted between January–May 2019 and consisted of a synchronous and an asynchronous learning component, treated for research purposes as a single integrated intervention. Children participated in weekly sessions with a virtual teacher, which lasted approximately 45 minutes and took place via a free videoconferencing platform. For the purposes of the blended intervention, the national curriculum for primary English was organized around collaborative mini projects which permitted differentiation of pupil output in two keyways:

1. tiered product assignments: each mini project culminated in the creation of a product which allowed pupils to start at a different entry point \(e.g.,\) reviewing for some and extending learning for others, or a single assignment addressing multiple curricular components in response to pupils' varied levels of readiness. Open-ended tasks with more than one right answer lend themselves particularly well to personal response. Examples included \(Internet-based\) collaborative investigations, surveys and extended enquiries; interdisciplinary mini projects \(e.g.,\) involving tasks which required students to identify spatial relationships between objects and grapple with measurement concepts and time through open-access and user-controlled real-time night sky simulation software, such as \textit{Stellarium}; and collaborative online game development \(e.g.,\) designing and developing gamified song-based learning tasks for the existing online learning community via the \textit{lyricstraining} web application; and

2. choice of tasks supported the pupils' use of varied modes of expression, resources, and technologies \(e.g.,\) product formats that allowed learners to express themselves in ways other than written language alone.

Further, a great deal of thought was put into how meaningfulness could be preserved during the intervention; therefore, all content was sourced from authentic resources, while tasks and topics were selected such as to encourage the learners to draw linkages between the ideas and skills they study in school and the ways in which these are used in real-world situations.

As a way of providing input to the learners, along with opportunities for guided and controlled practice of the target language in children's own time, an asynchronous online learning component was designed to complement the live sessions. This made it possible to obtain comparable results in terms of the participants' learning outcomes, whilst compensating for a lack of textbooks in the participating schools. The study adopted a microlearning app, EdApp, as the e-learning platform—a decision which was driven by a number of factors. The full range of these is given elsewhere (see Lymperis, 2021), however, amongst the most important determinants was the possibility of: (a) mastery-based instructional design options \(e.g.,\) of configuring conditions for learners' progression through the material; (b) user, group, and level metrics on performance and engagement; (c) offline mode, which made it possible for learners to complete lessons when Internet connection was poor or non-existent by pre-downloading materials; and (d) affordability\(^3\).
Main text

Impact of the intervention on EFL achievement

The strength of association between the intervention and students’ academic achievement at post-test was examined using ordinary least squares regressions, controlling for prior attainment; time spent on the asynchronous component of the intervention (asynchronous) and in sessions during the intervention (synchronous); English proficiency level (level); amount of English language learning taking place outside school (tutoring; in hours/week); and pre-test scores (pretest).4

Table 1 provides an overview of the results of the analyses across the four language domains. Overall, it was found that the amount of time spent on the online learning platform, EdApp, used as a proxy for the asynchronous component of the intervention, was a strong predictor of mean EFL achievement at post-test. Separate analyses for each outcome measure upheld this finding, with the exception of writing skills, in which case time spent online could not be established as a significant predictor. With the effects of the other four factors held constant, for every approximate three hours or more spent on the self-paced online course, an extra 8.0, 5.0 and 4.7 percentage points were achieved on the aural comprehension, vocabulary and grammar assessment at post-test, respectively. Conversely, the amount of live contact was not found to have a significant direct effect on post-test performance in any of the four linguistic domains examined.

Table 1: Multiple regression on post-test achievement

<table>
<thead>
<tr>
<th></th>
<th>Vocabulary Knowledge</th>
<th>Grammar Knowledge</th>
<th>Aural Comprehension</th>
<th>Writing Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>β</td>
<td>β</td>
<td>β</td>
</tr>
<tr>
<td>Asynchronous</td>
<td>.216**</td>
<td>.198*</td>
<td>.294*</td>
<td>.025</td>
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<tr>
<td>Synchronous</td>
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<td>-.103</td>
<td>-.022</td>
<td>.034</td>
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<tr>
<td>Level</td>
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<td>.398***</td>
<td>.586***</td>
<td>.140</td>
</tr>
<tr>
<td>Tutoring</td>
<td>-.050</td>
<td>-.143</td>
<td>.020</td>
<td>-.066</td>
</tr>
<tr>
<td>Pretest</td>
<td>.713***</td>
<td>.541***</td>
<td>.242</td>
<td>.771***</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.855***</td>
<td>.833***</td>
<td>.690***</td>
<td>.660***</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001

Factors influencing learning outcomes in the blended remote intervention

Additional aspects of data collection/analysis embedded within this study allow further illumination of the mechanisms underpinning the efficacy of the blended learning intervention. Evidence from the student focus groups, headteacher and parent interviews is analyzed below.

Meaningful social bonding

The most common theme to emerge in the focus group data analysis was students addressing social aspects of the intervention, with the main code within this theme being students saying that they enjoyed participating in group games in class. Other codes included enjoying asking questions about their peers and talking about themselves to others, including sharing their opinion on various topics. The third code identified—‘coming closer as a team’ whilst working together towards a goal—is an in-vivo code that emerged in the context of providing explicit reasons for their enjoyment of working collaboratively. The one dimension which underlay student responses around enjoyment pertained to a pronounced need for human bonding, acceptance within the peer group, and a sense of belonging in a circle that shares a common purpose. In the case of educational team games, this shared purpose took the form of contributing to one's own team success or advancement. The need for social bonding appears particularly strong in the following excerpt, where one high-performing 12-year-old student even went so far as to proclaim his own hierarchy of needs, placing the need for peer relationships before individual accomplishment and prestige:
I would rather even not be the smartest one in class – I’d rather be dumber than a box of rocks but be around other children. Because you can’t really do anything on your own. Okay, let’s suppose I get straight A’s...so what?

(Students A, Delphi Primary School)

Perceived benefits of collaboration

The extent to which students perceived collaboration as a beneficial work mode was also found to be a recurrent theme. Responses mostly centered around efficiency and possibility to generate more ideas during a task:

What I liked most was when we worked in teams because we helped one another: if there was something I didn’t know, or Stamatis or Vasilis didn’t know, we would discuss it and solve it together.

(Students A, Arsinoe Primary School)

However, not all children viewed collaboration as beneficial and fruitful. There was also evidence in the focus group data of students having experienced collaboration as merely a peer-tutoring process which entailed telling lower-ability group members what to do and making sure that the latter followed through, as well as convincing the disengaged to engage, ultimately leading to a culture of dependency and thus compromising learning. These views were vocalized by average-to-high-performing students belonging to the youngest age group (aged 8 years):

[The test] was perfect because we didn’t have to say ‘that’s how you need to write this word’ – I didn’t have to say to anyone ‘write this’ or ‘write that’.

(Students A, Palaeopolis Primary School)

Engagement

Rather unsurprisingly, ‘engagement’ emerged as another recurring theme in the focus group data. Yet, what was of interest in this analysis was to try and tease out the precise aspects of each of the two components of the learning program that engaged the students in the learning process, even after the novelty effect had worn off. When asked to share examples of lessons that they had found to be particularly useful, interesting or engaging, students referred to lessons where they felt they had ‘learnt new things’, with ‘new things’ being perceived as new knowledge about the world that was not necessarily linked with the EFL curriculum. Rather, this new knowledge was often cross-disciplinary and, on the surface, appeared to deviate from expected, ‘schoolified’ content:

The lesson that I really enjoyed was the one with the prices. Besides the fact that we discovered some Greek products over there [in overseas markets], we were also searching online as opposed to just writing things.

(Students B, Delphi Primary School)

Linked to that were comments about lessons, or specific tasks within lessons, that encouraged students to stretch their imagination and think beyond the bounds of reality as they know it; yet, as can be seen in the following excerpt, levels of engagement in such tasks were at least in part dependent upon children’s perceived capacity for creative imagination as well as the degree to which they were able to relate to the topic:
The only lesson which I found a bit boring was the one where we had to design our own dream school...that was a bit boring because we didn’t know what to do, we didn’t have any imagination...but then I had this idea about unicorns and a tree school – as we named it – and from that point on we gained momentum!  
(Student A, Arsinoe Primary School)

Perceived digital competence

Despite the fact that all but one had access to a computer at home⁵, learners possessed varying levels of digital skills, resulting in differing attitudes towards the use of the app at home. Specifically, the most common code under this theme was one which pertained to participants’ perceived typing skills, with those who had had more experience, and therefore felt more confident using a keyboard, expressing a preference to work on the app rather than with a book. Similarly, those with a perceived ‘bad handwriting’ shared the same positive views on using the app:

Student A: I believe it's better to do our homework on the app. For one reason only. (Turning to the other two) You know why? Because I can't write very well by hand and my writing is a little sloppy -

Student B: It can't be worse than ours!

Student A: …and working on the keyboard is faster. Because if I were to do one task such as those we were doing that took us 30 minutes, it might have taken us one hour or one hour and a half. Because writing is harder than typing.

Student C: I said it's easier on the internet, too, because you don't need to write.  
(Delphi Primary School)

Conversely, students belonging to the youngest age group (aged 8 years) noted books as their preferred medium of study, citing two reasons for this: (a) being poor typists, and (b) finding working with the book less cumbersome or prone to technical issues than working on the computer.

The value of novel experiences

Finally, when asked about their motivation for participating in the study and their thoughts on aspects of the learning program that they had found to be particularly useful or effective, a number of parents and headteachers brought up the notion of exposing children to novel experiences being instrumental in promoting student growth and engagement. In contrast with my initial expectations, this was not limited to children living in relatively isolated conditions, but rather appeared to be a more global theme which was independent of geographic location or degree of remoteness:

Delphi head teacher: What [the children] did want to do was have regular contact with someone who lived so far away – beyond the bounds of their own village but also of Greece – and do that through the use of technology, which they find fascinating. They wanted to have contact with someone other than their teacher who would talk to them about different things.
Discussion

The primary aim of the current study was to investigate the effectiveness of a blended distance learning model in increasing EFL attainment amongst primary learners living in underserved geographical areas where school staffing difficulties mean that they are otherwise unable to access this area of the national curriculum. With respect to RQ1, there were clear indications that, after 12 weeks, the blended learning intervention impacted positively on student EFL attainment within the settings—with both the quantitative (at least in some areas) and qualitative data supporting this view. There were statistically significant improvements between pre- and post-test across four out of five L2 constructs. Moreover, it was possible to significantly predict improvement in three out of four language areas (vocabulary, grammar and aural comprehension) from the amount of exposure to the intervention, even after controlling for characteristics at the classroom, child and family level. Contrary to the experimental hypothesis, a statistically significant intervention effect was not identified on the writing skills measure.

A further aim of the study was expressed by RQ2 and was concerned with unearthing the specific mechanisms which mediate and/or inhibit primary learners’ EFL progress in a blended distance learning model. Although peer collaboration was one of the three concepts around which the design of the BL program was centered, focus group interviews indicated that the extent to which children were able to engage in effective collaboration during the live sessions was affected by individual perceptions around the value of collaborative learning: those who viewed it as a beneficial and productive way of working in the classroom were able to benefit more from group work compared to those who described collaboration as merely a process which entailed telling lower-ability group members what to do (i.e., peer tutoring) and convincing the disengaged to engage. According to this latter subset of children, such practices were far from conducive to learning; instead, they were thought to lead to a culture of dependency, thereby compromising individual progress. These observations are supported by Kirschner, Paas and Kirschner (2009), who argue that whether collaboration will occur depends on the perceived or actual costs involved in the process: only if learners believe that the extra time and effort that need to be invested to work together will pay off in terms of effectiveness and efficiency of learning, will they feel motivated to communicate and coordinate with others. This may help explain why negative attitudes towards collaborative learning were vocalized almost exclusively by students with higher self-efficacy beliefs; it may be that, for them, the transactional costs exceeded the returns. Children’s mixed pattern of views and experiences of working in groups could also serve as an indication that the value of working collaboratively had not been discussed explicitly enough or in sufficient depth with them. In particular, ways in which higher-ability students could stand to benefit from the partnerships might have served to minimize observed discrepancies. As Morcom (2016) highlight, explicit teaching of personal values and attributes such as resilience, empathy and respect for others, supported by targeted social and reflective practices, can support effective peer scaffolding practices and collaboration amongst primary pupils.

Despite children’s differential views on the value of collaborative work with respect to cognitive performance, social aspects of the intervention were in fact the strongest theme to emerge from the focus group data. Asked what they had enjoyed most in the program, the majority of children mentioned participating in group games in class, finding out things they might not know about their peers and, likewise, talking about themselves to others. Underlying student responses, overall, was a social dimension which pertained to a need for human bonding, establishing and maintaining friendships, acceptance within the peer group, and a sense of belonging in a circle that shares a common purpose, all of which were subsumed under the theme ‘meaningful social bonding’. In this context, the term ‘meaningful’ is used to describe experiences students engaged in because they had intrinsic or internalized motivations for doing so (Nicholson, 2015); the notion is rooted in Mezirow’s model of transformative learning, where an experience can allow transformation of existing beliefs and long-term change (Mezirow, 1991). Thus, it seems likely that in discussing aspects of themselves which did not normally form part of peer conversations, or by simply sharing a mutually enjoyable experience, some children’s views about each other underwent shifts, possibly even breaking down previously held stereotypes and prejudice, thereby enhancing group cohesion.
Children’s levels of engagement during the live sessions also appeared to be influenced by the quantity and quality of opportunities they were given to think ‘out of the box’, come up with original ideas and objects, as well as new solutions to problems, or ways of looking at problems. Robinson (2017) defines imagination as the ability to bring to mind things that are not present to our senses, and creativity as the process of putting this ability to work to create original ideas that have value. Indeed, focus group responses included references to tasks that had encouraged children to step out of the here and now, take a different view of the present, and work to design alternative futures. From a deep language learning perspective, this act of going beyond existing beliefs about ‘what is’ and ‘what can be’ is precisely what sets in motion a process of personal transformation amongst language learners, thereby allowing for social and self-actualizing goals to be embedded within the second language curriculum (Tochon, 2019).

Importantly, during project work, children were given space to play with ideas freely and spontaneously, and express their personal feelings, while, at the same time, the design framework they were provided with imposed constraints which promoted disciplined thinking, attention to detail, and the development of specific strategies and linguistic skills (Read, 2015). While freedom and choice were pivotal in motivating and helping children push the boundaries of what they thought possible, working within formal (including linguistic) constraints did not seem to stifle creative work (Robinson, 2017). As Tochon (2019) argues, shifting away from a rather liberal conception of the learner as an entirely autonomous decision-maker can in fact help us define flexible educative projects that would reconcile curriculum outcomes with the needs and preferences of the students.

Finally, the results of this study also replicate those reported in previous research involving adult students, as the direction of the qualitative findings shows that learners’ perceived digital competence and their attitudes towards the autonomous use of a web-based learning platform as a medium of study were fundamental factors in their quantity and quality of interactions with the asynchronous component of the BL intervention (Wichadee, 2018; Prior et al., 2016; Tang & Chaw, 2016). This demonstrates the importance to learning of conscientious attention to learners’ perceived and actual digital competence, and the need to problematize discourse surrounding the alleged natural affinity of so-called ‘digital natives’ to use technology in a sophisticated way (Prensky, 2001). Such broad sweeping assumptions are especially problematic when applied to small rural Greek primary schools where, just like with English, children do not have access to ICT instruction.

**Limitations and future research**

The current study is limited in a number of respects. For one, and although steps were taken to address possible threats to reliability and validity within the quasi-experimental design used in this study, it is uncertain whether the gains made by the participants in their EFL attainment were due to their exposure to the BL intervention. Potential confounders (e.g., English learning outside school and extra-curricular contact with the L2) were anticipated and controlled for in the regression models, yet there is a possibility that some differences in unknown confounding variables remained between the participants. More rigorous evaluations in settings which will allow the inclusion of a comparison group would be valuable in determining the relative impact of the BL intervention compared to different iterations of the blended remote model.

Second, it would be beneficial to do this study again, this time adopting an integrated assessment design which would be based on sociocultural perspectives; this might involve collaborative group projects with a focus on group interaction processes and open-ended problems, whilst actively incorporating clear performance expectations for each linguistic skill. Yet, given that ‘depth’ in the deep approach to language learning is relative, not absolute, tasks should be designed which are flexible enough to accommodate the unforeseen that comes with differentiated approaches. For assessment purposes, linguistic progress could therefore be determined on the basis of quantitative criteria such as relative breadth of lexical knowledge or syntactical complexity demonstrated.
Conclusion

This study is, to the best of my knowledge, the first attempt to systematically investigate the efficacy of blended remote learning in low-resource K-12 settings in Greece. The present research has demonstrated that this novel approach holds promise for improving academic attainment in EFL learning, especially amongst primary children (ages 8-12) attending the hundreds of small multigrade schools across the country that continue to this day to face systemic exclusion from this area of the national curriculum. The study also advances second language teaching and learning discourse by expanding the conceptualization of L2 learning to involve not only the mastery of the various linguistic patterns necessary for effective communication, but also a capacity for meaningful social interaction and peer collaboration, an ability to leverage imagination and creativity, and an interest in exploring and discovering new possibilities. The findings of the current study provide a basis for the further development of the field, by scaling up the BL approach to determine whether these positive findings can be replicated in other small multigrade schools operating in remote and rural areas suffering from long-standing systemic marginalization. In doing so, it will be possible to gain further insights into the role that a deeper approach to second language learning can play in creating successful L2 learners who are able to harness their socioaffective as well as cognitive capital, even in settings where educational resources are not necessarily in abundance.

Acknowledgements

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Ethical statement

All research was conducted according to the British Educational Research Association Ethical Guidelines for Educational Research (BERA, 2018) as well as the Newcastle University Code of Good Practice in Research (Newcastle University, 2018), and gained the approval of the Faculty of Humanities and Social Sciences Research Ethics Committee at Newcastle University. Measures were taken to ensure that participants knew exactly what the research involved before consenting. Information sheets were translated into Greek and were provided and discussed with all the headteachers, parents and children, ensuring they had the opportunity to ask questions, that they knew they could withdraw at any time and that their anonymity would be protected. The children who received the intervention would not otherwise have been attending any English classes in their schools, and therefore the intervention did not introduce learning risks that might have arisen in the case of deviation from normal school practice.
ComposeMe: Designing technology to reduce academic writing anxiety and increase attention in higher education

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Nithin Shamsudhin, Freelance Audio Producer

Abstract

Attention has a big role to play in various kinds of learning but all learners have different constraints on their attention, anxiety being one of the most debilitating ones. Anxiety causes students difficulty in allocating adequate attention for learning tasks that are expected of them in higher education, something that sets them up for failure. While anxiety exists in many forms in higher education, a particularly debilitating one is academic writing anxiety which makes students apprehensive of engaging in academic writing tasks. It is caused by low self-efficacy, extremely high fears of negative evaluation, stressful genres of writing like exams as well as socio-economic and cultural factors like race, gender, caste, linguistic background etc. It manifests in the form of several physiological, cognitive, and behavioral symptoms like increased heart rate, excessive confusion and task avoidance. To become future-ready, an important skill that young people need to develop is the ability to expertly manage their academic writing anxieties. Through our research, we wish to develop a technological intervention that helps college students do exactly this.

Our long-term study will involve three phases: Phase 1: where we will design an intervention in the form of an online application that consists of anxiety reducing audio messages that will be integrated into Google Docs, a popular platform where college students write academic assignments; Phase 2: where we will implement this intervention to a sample of college students; Phase 3: where we will qualitatively and quantitatively assess the impact that the interventions in our application have on students and test our hypothesis that such interventions can reduce students’ academic writing anxiety and increase their ability to pay attention to their academic writing tasks. We have completed Phase 1 so far, whereby we have built an application called ComposeMe that consists of anxiety-reducing interventions that use principles of cognitive behavioral therapy and ambient music, in the form of customized audio support provided to students while they do academic writing on Google Docs. In this paper, we will describe the need for such an intervention, our process of building it, demonstrate what it does, and chart out our future plans for research using it.

Keywords

Anxiety, academic writing, attention, writing anxiety, writing apprehension, emotions, academic writing anxiety, well-being, mental health, higher education
1. Introduction

Anxiety is a major debilitating problem in higher education that negatively impacts students across disciplines and countries (Bhujade, 2017; Mohebian et al., 2017; Rehman, 2016; Vitasari et al., 2010). In recent surveys, researchers have found that anywhere between 11.7% (Auerbach et al., 2016) to a staggering 46% (Yonder, 2021) students could be suffering from anxiety in higher education institutions across the world. It exists in many shapes and forms and severely impacts students’ abilities to perform academically. Our research seeks to better understand and create interventions for a particular type of anxiety that plagues students called academic writing anxiety (henceforth to be called AWA in this paper) which is particularly significant given the ubiquity of academic writing tasks across disciplines and geographical contexts. To better understand what academic writing anxiety or AWA is, how it impacts students, and how our research seeks to better understand and address it, in this introduction section, we will first explain what anxiety is in general, and how it impacts students in academic spaces. Then using that grounding we will approach AWA and our proposed interventions for understanding and tackling it.

1.1 What is anxiety?

Sanders and Wills (2002) synthesize existing research in psychology on anxiety and argue that at the cognitive level, anxiety involves a repetitive or fixated style of thinking that creates overestimation or exaggerated appraisal of the likelihood of an event or stimuli turning dangerous and leading to immense costs or awful experiences, along with an underestimation of the self’s ability to cope with potential threats. This thought pattern is compounded by core beliefs and assumptions which are absolute, unconditional statements about self and the world developed during childhood interactions with family, environment, and society which exacerbate anxious appraisals of reality. For example, the desire for excessive perfectionism as the only means to gain social acceptance is a core belief that leads to anxious experiences. While anxiety dominantly exists in such cognitive patterns, it also manifests in various other dimensions of experience. At the physical level, people who feel anxious often also suffer from symptoms like reduced ability to modulate attention, heart palpitations, shortness of breath, increased bowel and urination frequency, sweating, panic attacks, cramps, muscle twitching, insomnia, fatigue, irregular appetite, etc. At the behavioral level they often demonstrate avoidance behaviors, withdrawal, obsessive-compulsive task repetition, safety behaviors etc. All these symptoms do not emerge out of a vacuum though but are generated through triggers that emerge out of individuals’ social environments.

According to Spielberger and Reheiser (2009) anxiety can exist in two forms: i) State anxiety (S-anxiety) which is short term and domain or situation specific i.e. it gets triggered only when individuals are in certain situations or domains, and ii) Trait anxiety (T-anxiety) which is long term and more of a generalized personality trait which is defined as tendency towards “anxiety-proneness as reflected in the frequency that anxiety states have been manifested in the past and the probability that feelings of S-Anxiety will be experienced in the future” (Spielberger and Reheiser 2009, p. 276). These two aren’t mutually exclusive though. While some people have relatively specific and rare occurrences of S-anxieties, “[p]ersons high in T-Anxiety experience more frequent and intense feelings of S-Anxiety” (Spielberger and Reheiser 2009, p. 278). Thus, while there can be people who have S-anxieties who do not have T-anxiety, there cannot be someone who has T-anxiety and doesn’t have any S-anxieties.

1.2 What is academic anxiety? How does it impact students’ attention?

S-anxieties can occur in any domain or situation of life and academia is a space that is especially prone to many kinds of s-anxieties which can be debilitating for students with high T-anxieties as well as for students who only experience academic S-anxieties. Many of these academic state anxieties have been explored by researchers, for example, examination anxiety (Zoller and Ben-Chaim 1989), mathematics anxiety (Maloney and Beilock 2012), foreign language classroom anxiety (Horwitz et al. 1986) etc.
A major impact that academic anxieties have is that they reduce students' working memory capacity and ability to modulate attention which eventually leads to low confidence, bad academic performance and dropouts (Owens et al., 2010; Vitasari et al., 2010). According to Eysenck et al.'s (2007) attentional control theory, anxiety impacts cognitive processing or working memory performance by reducing individuals' control over their attention. Working memory is the cognitive architecture where sensory information from our environment gets stored and processed using limited attentional resources. Different types of sensory information compete for attention in our working memory. What anxiety does is that it drains our attentional resources and forces our minds to pay attention to the stimulus-driven attentional system (which is automatic and scans the environment for stimuli and allocates more resources to those stimuli which seem threatening) and prevents us from shifting our attentional resources to the goal driven attentional system (which is driven by the individual's goals). In simple words, anxiety thus forces an individual to pay attention to the sources of their anxiety rather than to the goals that they might have for doing their academic assignments. While in some cases, where the source of anxiety is a real physical danger, like in the case of life-threatening situations like fire or violence, this is a useful adaptive mechanism. However, in many situations in the classroom where many anxieties do not present any immediate danger (like excessive fear of evaluation etc.), this system can become maladaptive and counterproductive.

1.3 What is Academic Writing Anxiety (AWA)?

Within the many kinds of state-anxieties that thrive within higher educational spaces, AWA is one of the major ones given the ubiquity of academic writing requirements across disciplines and institutions. It is a problem that plagues students across the world with researchers in countries as wide ranging as Croatia (Kostić-Bobanović, 2016), Egypt (Salem, 2007), Iran (Jebreil et al., 2014; Rezai and Jafari, 2014), Jordan (Salem & Foo, 2012), Malaysia (Min & Rahmat, 2014), Pakistan (Dar & Khan, 2015), Saudi Arabia (Aloairdhi, 2019; Sadiq 2017), Taiwan (Wu & Lin, 2016), Turkey (Öztürk and Çeçen, 2007; Sivaci, 2020), and USA (Cheng, 2004; Cronk-Raby, 2018; Daly & Miller, 1975; Huerta et al., 2017; Martinez et al., 2011; Wadleigh 2009) having found empirical evidence for it.

The two most popular constructs that help us understand it are Daly and Miller's (1975) notion of Writing Apprehension, originally designed keeping L1 English writers or writers for whom English is their first language in mind, and Cheng's (2004) notion of Second Language Writing Anxiety which expands on the earlier notion to explore the specific anxieties of the L2 English writers or writers for whom English is the second or third or fourth language. The first one, i.e. writing apprehension is defined as “an individual difference associated with an increase in anxiety when one is faced with situations requiring writing” (McAndrew, 1986, p.43) and is measured by the Daly-Miller Writing Apprehension Test (1975), which is a 26 item instrument on a 5 point Likert scale. Similarly, Cheng's (2004) concept of Second Language Writing Anxiety is defined as “a relatively stable anxiety disposition associated with L2 writing, which involves a variety of dysfunctional thoughts, increased physiological arousal, and maladaptive behaviors.” (Cheng, 2004, p.319) and is measured by the Second Language Writing Anxiety Inventory which is a 22 item instrument on a 5 point Likert scale.
1.3.1 Existing understandings of the causes and effects of AWA

There are a range of causes and effects of AWA, which have been synthesized in Fig. 1:

![Figure 1: Causes and Effects of AWA, synthesized from the works of Daly and Miller (1975) and Cheng (2004).](image)

1.3.2 Research Goal #1: Improving the understanding of AWA

While the causes and effects of AWA mentioned in Fig. 1 are useful, they need to be expanded for a more holistic understanding of the problem. First, the impact of AWA on students’ ability to pay attention has been relatively under-explored. Second, current research focuses on AWA in isolation, without considering how anxieties from other domains of students’ lives, for example, their economic conditions, or family’s physical well-being, might be impacting their ability to focus on and feel confident about their academic writing. Third, the ways in which socio-demographic factors like gender, caste, race, class etc. play an active role in constructing students’ experiences of these different types of writing anxieties within the classroom has also been underexplored. Fourth, most measurements of this anxiety have been limited to survey type questionnaires. There is potential for experimenting with new types of measurement apart from the existing questionnaire type tests, for example by using cortisol blood tests, and longitudinal ethnographic studies. We seek to expand existing studies of academic writing anxieties along these four directions in the future.

1.3.3 Pre-existing interventions that seek to tackle AWA

Within writing studies, research on finding remedies for writing anxiety has so far found that peer-feedback (Sivaci, 2020); process based approaches (Smith 1984; Ajmal and Irfan, 2020); trustworthy allies (Cronk-Raby, 2018); non-graded exploratory writing (Kostić-Bobanović, 2016); collaborative writing in the physical classroom (Wynn, 1999) as well as using computers in the online space (Lamazares, 1999; Wu, 2015); dialogical writing (Shelton, 2014); portfolio writing (Öztürk and Çeçen, 2007); journaling and free writing (Salem, 2007); experiential writing (Tighe, 1987); and positive and encouraging evaluation (Zimmerman & Silverman, 1982) can reduce writing anxiety in students.
1.3.4 Research Goal #2: Develop better interventions for tackling AWA and increasing attention

While the interventions discussed so far have been impactful in tackling AWA to some level, there is an urgent need to improve solutions in two directions. First, all existing solutions discussed so far have been imagined only in the form of things that teachers can implement for their students inside classrooms. Currently there is no work that imagines developing scalable interventions that can be implemented at a large scale without needing the physical boundaries of a classroom or teachers. Second, currently the interventions practiced within writing studies are not in sync with latest developments in the field of psychology and its interventions in treating anxiety.

Over the past few decades, a wide range of approaches have been developed which attempt to tackle the different dimensions of general anxiety like new forms of cognitive-behavioral therapy or CBT including reframing techniques like metaphor reframing (Lyddon et al. 2001) and immersive therapies like the use ambient music and nature sounds to soothe physiological symptoms of anxiety (Cutshall et al., 2011; Nilsson 2008) which can be used independently or in conjunction with cognitive behavioral therapy. Recently with the emergence of computers and mobile apps, there has also been a surge of computer or mobile assisted cognitive behavioral therapy that attempt to increase CBT’s accessibility and ease of use (Wright et al., 2019; Sucala et al., 2017).

In our study, we would like to integrate these emerging insights on anxiety amelioration from psychology to develop an intervention that can help in reducing students’ AWA. Specifically speaking, our intervention will specifically synthesize CBT in the form of metaphor reframing along with physiological interventions like ambient music immersion therapy in the form of an easily accessible and scalable computer application. Through this application, we would also like to collect data that helps us better understand students’ experience of this anxiety, how it impacts their attention and also how the interventions of our application impact their experience of both.

2. Methods

To better understand AWA and to design an easily accessible application that can empower students to tackle it, we have conceptualized a three-phrase project — Phase 1: Designing the Intervention; Phase 2: Implementing Intervention; Phase 3: Analyzing and Interpreting Data. These phases will continue in a cyclical and iterative manner informing each other. At the current stage of our progress, we have finished Phase 1, which is what we will be describing in this section of the paper.

2.1 Initial conceptualization

The original idea of our intervention was conceptualized by Gupta, who is a researcher, teacher, and administrator of academic writing and has been teaching college students how to write academically for over five years now. As a teacher, he consistently noticed that mental health issues, especially anxiety, acted as a consistent and universal debilitating factor that prevented students from flourishing in their classrooms. To remedy this, he started experimenting with a wide range of interventions in his classroom, like expressive writing, raising students’ emotional awareness, using ambient music at the beginning of his classes etc. (see Gupta, 2021). While these strategies led to promising results in his own classroom, he was dissatisfied with the fact that his pedagogic experiments were limited to his own students and could not be shared with a wider range of students, especially the ones who did not have access to elite universities where experimental and progressive pedagogies are often practiced. This is when he started to think of the idea to develop an easily accessible and widely available mobile or computer application to scale up the potential impact that his pedagogical experiments could have on students’ AWA. He imagined this application to be a series of therapeutic audio messages containing advice as well as soothing music that could be delivered to students while they felt anxious about their academic writing. After brainstorming with his friends Dutta and Siddharthan, he settled on the name ComposeMe for it.
2.2 Process of interdisciplinary collaboration

To do this, however, he knew that it would have to be an interdisciplinary team effort that would allow a wide range of specializations to come together. Based on his initial idea, he reached out to Kalwani, a games developer, and Nithin Shamsudhin, an audio producer to develop such an interdisciplinary team. What follows now is our description of the respective pieces of the puzzle that we put together to develop our application.

2.2.1 Textual Content

Gupta began developing the textual content for the application by reflecting on his own process of dealing with AWA as a teacher as well as a student. He started making extensive notes about all the advice that he had given his own students whenever they experienced AWA. Simultaneously, he also started doing an extensive literature review on the most common causes of this anxiety as well as the common ways in which teachers try to treat it. He also surveyed new interventions being developed in the discipline of psychology to treat generalized anxiety. This is where he found a unique technique of cognitive behavioral therapy or CBT called metaphor reframing (Lyddon et al. 2001) which seemed very promising to him. CBT is the most prominent approach in psychology to treat anxiety which attempts to analyze and reframe existing cognitive schema or interpretive mechanisms due to the which anxious individuals conceptualize stimuli in ways that exaggerate their potential dangers and threats and underestimate the individuals' own abilities to cope with them (Sanders and Wills, 2002). Cognitive reframing of anxiety can impact affective as well as behavioral dimensions of anxiety. Metaphor reframing (Lyddon et al. 2001) is a particular type of CBT which seeks to explore the underlying metaphors through which individuals conceptualize phenomena (for example, thinking of an argument with a partner as a battle that one party needs to win) and then to reframe them in ways that would produce less anxiety (for example, reframing arguments as dances that partners engage in, in order to explore each other and to reach mutually satisfying insights) (Lakoff and Johnson, 2003). Using these ideas, Gupta isolated 5 most prominent causes of AWA, their underlying conceptual metaphors, and created therapeutic scripts around potential new metaphors that could be used to reframe students’ thinking about those causes. Fig 2. summarizes this work.

<table>
<thead>
<tr>
<th>Cause of AWA</th>
<th>Underlying Conceptual Metaphors</th>
<th>Proposed New Metaphor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Confidence or Self Efficacy</td>
<td>Writing seems like a monumental task or a huge mountain that one needs to climb and the self seems someone who has little strength or skill to complete this task.</td>
<td>Instead of a mountain, rethinking writing as a garden where one needs to do just a little tending, a little pruning everyday.</td>
</tr>
<tr>
<td>Competition</td>
<td>Peer-peer relations seem like a race where everyone is competing against each other.</td>
<td>Instead of a race, rethinking peer-peer relations as planetary orbits where no planet needs to win the race, rather all of them complete their revolutions around the sun in their own graceful time and gravitationally support each other’s’ unique journeys.</td>
</tr>
<tr>
<td>Genres like Exams</td>
<td>Do or die situations where if we don’t succeed once we are branded failures for life</td>
<td>Rethinking exams as experiments where failing leads to new insights and people have the potential to do multiple experiments iteratively till they succeed.</td>
</tr>
<tr>
<td>Crisis situations in life</td>
<td>Any kinds of gaps or breaks in our academic work that our personal lives force us to take will completely derail our academic writing work and self worth.</td>
<td>Rethinking gaps or breaks in academic work as the silences in a saxophone or guitar solo that make the notes that we play (or the writing that we do) more meaningful.</td>
</tr>
<tr>
<td>Writing Environments</td>
<td>Messy and out of our control or not significant to our writing.</td>
<td>Rethinking writers as birds who need to build supportive nest like environments by collecting the right kind of materials and removing clutter around them to create a nourishing environment for writing.</td>
</tr>
</tbody>
</table>

Figure 2: Conceptual metaphors underlying common causes of AWA and our proposed new metaphors to reframe them.
Here is a sample script for one of these metaphors, the one that we created for the issue of competition:

Thank you for choosing to compose yourself. Often, we think that it's only our writing that needs composing, but a lot of the times, we, the writers and the environments in which we work, need composing too, and I am proud of you, for doing this important work that will go a long way in helping you grow as a writer. For a few seconds now, stop your writing, stretch your hands, take a couple of deep breaths and just listen to my voice.

A couple of weeks ago I was feeling really anxious and jealous. Somebody in my class had just gotten a big publication in a prestigious research journal, while I was barely managing to submit my assignments on time. During this time, my friend Aruni who is a fantastic writer and teacher himself gave me a fantastic piece of advice that is changing my life. He said that writers are like planets. All of us have our own orbits. Earth's orbit is very different from Mars and Mars' orbit is very different from Jupiter, right? While all of them take different paths and different times to circle the sun, all of them are majestic and beautiful in their own ways. Just like that, your writings too need to revolve on their own special orbit. Don't try to force them onto the path that others are taking or you'll head for course collision! Imagine if the planet Mars suddenly decided that it wants to jump into earth's orbit and start revolving around exactly like it does!

We would all be dead if that were to happen you know. But sadly that's what many of our schools and colleges make it seem like we need to do. They make it seem like there's just one correct way to write and all other ways are wrong. But I'll let you in on a little secret. If you talk to people who actually do writing in the real world — like researchers or journalists or fiction writers — most of them will tell you there is really no single correct way to write and all of us need to find our own unique styles while learning from everyone else's journeys out there. So instead of feeling anxious or jealous of all the other writers around you, take a deep breath, wish them good luck, learn from what they are doing but gradually focus on finding your own path, your own style, your own orbit. Trust me. Over time, you'll see other writers wanting to learn from your journey!

2.2.2 Sound

Once all the scripts were ready, we moved onto the sound phase of content creation which involved recording the transcripts being spoken and then editing and mixing them with music.

Due to a lack of funds and logistical problems because of the pandemic, we couldn't hire a professional sound recording artist or professional recording equipment which is why Gupta used his own voice to record all the transcripts at his home using Shamsudhin's guidance. Instead of using the mike in his laptop, Shamsudhin recommended that we buy an affordable but useful mike so we got the JBL CSLM20 Lavalier mike. We started recording using it, however there was still a lot of environmental noise coming into the recordings so Shamsudhin recommended an ingenious noise cancellation solution. He recommended that Gupta record all the transcripts while being huddled inside a blanket. This drastically reduced noise and Gupta recorded all the five transcripts using this method. Multiple recordings had to be done to ensure the right rhythm and prosody to enhance the phonetic quality of the content.

Once the recordings were done, Nithin used a sound editing and processing software called Logic Pro X. Just like word processors have options to edit and play around with the textual form (font, spacing, formatting etc.), audio processing softwares allow users to edit the wavelength, amplitude, pitch and frequencies of different sounds and mix them together. To do this, Shamsudhin first sourced music that he thought would be appropriate for us from the Youtube Audio library which is a library of copyright free music available for public use. Since the application was intended to alleviate anxiety amongst writers, Shamsudhin shortlisted calm sounding music from the Ambient genre in the library. Ambient music of the right kind has been shown to have calming, relaxing effects on listeners (Cutshall et al., 2011) as it helps people's minds get grounded in the present moment and its sensory inputs rather than thoughts about the past or the future (Hoffman, 2016). By doing this it “acts as a distracter, focusing the patient's attention away from negative stimuli to something pleasant and encouraging” (Nilsson, 2008, pg. 782).

After picking a couple of tracks that Shamsudhin felt would work well in this context, he placed them with Gupta's voice and selected the best fit. The ones that he chose were “Meeting Again” by Sprague (2019) and “Wander” by Fenn (2020). After selecting the tracks, he equalized them so that they don't interfere with Gupta's voice, and rather sit well in the background and set the context for his voice. Equalizing is a process of subduing or enhancing certain frequencies of an audio file, depending on the kind of context in which the music will be played.
2.2.3 Software

Recently with the emergence of computers and mobile apps, there has also been a surge of computer or mobile assisted cognitive behavioral therapy which increases accessibility and ease of use (Wright et al., 2019; Sucala et al., 2017). To the best of our knowledge, however, none of these have been used to tackle AWA. In order to make our interventions easily accessible and scalable to be used by a wide range of students in diverse contexts, we decided to make an application that would be compatible with Google Docs, a freely available web-based text editing software that is used by many college students to do academic writing across the world.

As our motive was to create a plug-in that works right out of Google docs, Kalwani began researching the tools available to build such a plug-in. Kalwani found that Google provides a fantastic framework called Google Script (also referred to as GScript) that helps one to write scripts (very similar to JavaScript in shape and form) that can add additional functionalities to all the Google products (such as Docs, Excel, Slides etc.). Using GScript, he wrote a simple program to add an additional menu option (alongside typical options like “File”, “Edit”, “Tools” etc. that users are commonly used to seeing on the Menu Bar in the Google Docs). He then set up a simple interface that would let the users play our team’s soundtracks to help them with their writing. The interface was set up with a basic Html5 and css framework. Kalwani has hosted the sound files at a free available hosting service so the soundtracks can be streamed on demand.

3. Main Text

Since our intervention or the application that we are building is multimodal, we request readers, if possible, to go to this youtube link and experience our application in an immersive manner for yourselves: https://www.youtube.com/watch?v=V-JmuSQsm8k&ab

For those readers who might not be able to experience the video though, we are including a textual description of what our application does along with images in this section.

To start using our application ComposeMe, users would have to download it from the GoogleDocs Add Ons option once we release it. After they do this, a button called ComposeMe will appear on the top right corner of their menu bars (see Fig. 3).

![Figure 3: A Google Docs document with the ComposeMe application button in the Menu bar at the top right](image)

Now, whenever a student feels anxious while writing their assignment in Google Docs, they can click on the ComposeMe button. Once they do that, the application will start to run and open a box on the right side of the document (see Fig. 4).
Here in the ComposeMe box, students will be able to choose from a list of options (see Fig. 5) in a drop box which consist of the most common causes of AWA. We selected these causes based on our survey of literature whose results we presented in the table in Fig. 2.

Based on whichever cause they choose, a particular audio intervention designed by us (see table in Fig 2 for details) to help them better understand and deal with their AWA will start playing automatically (see Fig. 6).
Figure 6: The audio intervention for “Competition” starts to play when students click on Competition as a potential cause for their AWA.

To experience what such an audio intervention would feel like, please go to this youtube link: https://www.youtube.com/watch?v=V-JmuSQsm8k&ab or if that is not possible, you can look at the transcript of one of our audio files that we shared in the Textual Content section above.

4. Conclusion

In its current shape and form, we believe that our application has the potential to provide an impactful intervention to tackle AWA. To the best of our knowledge, most solutions for AWA that have been implemented so far have been limited by the need for a physical teacher to do it for their particular set of students. Our application, by virtue of its easy accessibility, makes many of those solutions more easily and widely accessible by students across the globe. Also given the fact that our application is informed by emerging developments in psychology, it is definitely worth exploring beyond the existing solutions that exist within writing studies. To achieve the potential of this application though there are still lots of areas of improvement and expansion that we want to work on before we implement Phase 2 and Phase 3 of our project that we mentioned earlier.

First, we want to make the content of our application more accessible and engaging for a wider range of audiences across the globe. To increase accessibility of our application for differently abled students, we want to use principles of universal design learning and integrate a visual dimension of artwork along with the audio, and also supplement the audio with subtitles. To make it more engaging for a wider range of audiences across the globe, we want to do more exploratory surveys to better understand the reasons behind academic writing anxieties and create more customized content based on that, especially focusing on students who come from marginalized communities and might not have been well represented in existing empirical work.
Second, we also need to integrate an element of data collection within the application so that we better understand how students are using this application and the impact that it has on their anxiety and attention levels. For this purpose, we want to integrate questionnaires like the Daly-Miller (1975) Writing Apprehension Test and Cheng's (2004) Second Language Writing Anxiety Inventory within the app itself so interested students can take it. While these questionnaires are helpful, we also want to expand beyond these conventional methods and integrate other kinds of data collection. To understand students’ anxiety levels, we want to experiment with measuring their cortisol levels and also conduct longitudinal ethnographic studies of their experiences of writing anxiety over time using this application. To measure the impact of the application on their attention, we would like to explore the possibility of using eye tracking software which has shown potential in other studies to measure this difficult to measure construct (see Anson and Schwegler, 2012). For collecting all this data though, we understand that there are a lot of ethical issues that we will need to consider, and we will work closely with the Institutional Review Boards of the Universities where we implement our studies to do exactly that. We want to ensure, for example, that whatever data we collect is always anonymized and taken with consent from students. We also want to provide a space for students to be able to give us feedback on this application when they use it.

Third, we are currently reflecting on how to tackle the lack of personalization that our application offers. While general advice on anxiety can be helpful, “the art of therapy always lies in the fact that our models must be applied to an individual client, who will be in some respects different from any client the therapist has met before.” (Sanders and Wills, 2002, pg. 3). How do we personalize our advice for students? At one level we have given them the option to select from a series of content to see which works best for them, which offers at least some degree of personalization. There is also emerging evidence from contemporary psychologists that self-healing through the internalization of general advice is possible (see Lepera, 2021). But how can we do more? A major area of concern for us is student diversity. Is it possible for the same therapeutic advice to work for a student from a privileged community as well as for one who comes from a historically marginalized community? That is a question that we do not currently have an answer to but are deeply mindful of and committed to answering.

Fourth, we would also like to expand the content creation for the application by including the larger community of academic writing teachers. We would like to explore the possibility of creating an open source library where anyone could include therapeutic audio recordings on how to tackle different aspects of writing anxiety and these submissions could either be peer reviewed or rated by users so that other users can choose from a wider pool of content and create their own content, creating a well-knit user community.

Fifth, we are also opened to considering how principles of Artificial Intelligence, Natural Language Processing, and Machine Learning can be integrated to enhance the potential of our application. Catrina Mitchum, the Interim Assistant Director of Online Writing at the University of Arizona recommended that we could perhaps make our application prompt students about potential things that might be worrying them if it notices that they haven't written anything in Google Docs for a certain period of time. Kalwani is also interested to see if in the future our application can read student writing and offer specific feedback on their drafts either in the form of a chatbot or through a team of dedicated tutors. There would of course be several ethical considerations to think through if we were to use AI for reading student work which we will be considering if we ever decide to expand along these lines.

Once we have worked through these five areas of growth, we will then start Phases 2 and 3 of our project, whereby we will implement this application with a sample population of college students over an academic year and collect data on how our application is impacting their anxiety and attention levels. We will also interview the students over the year as well as conduct focus group sessions with them to better understand their experiences. The qualitative and quantitative data collected through this process will then be analyzed to better understand how our application can be improved in its future iterations.

This is an exciting time for teachers and researchers interested in experimenting with unconventional methods to tackle the problems that college students face. Google docs is growing to become a major site where students do most of their writing now. Given its open source and easily accessible nature, there is a lot of potential for teachers to create apps and help share their knowledge with thousands of students beyond their classroom. While our ongoing work is by no means a perfect example, we do hope that it does inspire teachers and researchers interested in shaping the future of education to think outside the box and feel more comfortable in experimenting with ideas that would’ve seemed unthinkable just a few years ago.
5. Acknowledgements

We confirm that none of the authors of this paper have any conflict(s) of interest with any of the contents of research discussed in this paper. We also confirm that none of us have received any financial support for this project.

6. Ethical statement

Since at the current stage of this project, no human or animal subjects have been used, no Institutional Review Board permissions were required or sought. Once we move into Phase 2 of implementation and data collection, we will approach the necessary authorities to do so.
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Creating inclusive education grounds: Shaping universities of tomorrow towards inclusiveness, not merely towards business

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Abstract
This article explores the inclusiveness of higher education system in Norway by taking refugee higher education as an indication. With unprecedented number of forcibly displaced people in the world, universities characterized by neo-liberal principles of competition and business ideals are less useful for social justice. I adopted a social inclusion theory, which can be understood through three dimensions: access, participation, and empowerment to address two research questions related to integration and higher education policies as well as policies and practices of two public universities in Norway. I considered Three White Papers, conducted semi-structured interview with experts at the universities and consulted institutional documents to gather necessary data. I analyzed the data using critical discourse analysis and thematic analysis. The data analysis revealed that the access dimension of social inclusion was dominant in policy documents. Moreover, the universities' policies and practices were not inclusiveness enough to refugees. Against this backdrop, I argue that even in countries with generous welfare systems, inclusive higher education should not be taken for granted. Rather, all stakeholders must consciously work towards a more inclusive higher education system. To achieve this, issues of social justice and human potential should be synchronized with principles of economic development.

Keywords
Access, empowerment, participation, refugee higher education, social inclusion
1. Introduction

This article will explore the inclusiveness of higher education system (and institutions) in Norway by focusing on refugee higher education. According to the United Nations Higher Commissioner for Refugees (UNHCR, 2020), by the end of 2019, there were 79.5 million forcibly displaced people in the world, of which 26 million were refugees. Until recently, the main focus of international donors and host countries is on the provision of basic necessities such as food and shelter to the displaced people. “Education is not often included in humanitarian responses” and higher education has long been considered as a luxury for refugees and other displaced people (Dryden-Peterson & Giles, 2010, p. 3). The enrolment rate of refugees in higher education was just 3% against 37% of non-refugee cohort globally in 2018 (UNHCR, 2019). Streitwieser et al. (2020) indicate that refugees resettled in developed nations were included in the figure.

Higher education institutions can play critical role in bridging the gap and contributing to a more equitable and just society (Berg et al., 2021; de Wit & Altbach, 2016). Many universities in various host countries have taken measures to facilitate refugees’ transition to and success in higher education (Berg et al., 2021; Brewis & Bergan, 2020; Naidoo, 2009; Streitwieser et al., 2019). Some of the most common initiatives included free language courses, preparatory academic programs or bridging courses, peer and academic mentoring, psychological support, access to facilities such as library as well as Wi-Fi, tuition fees waivers, adapted admission processes, recognition of previous educational documents, arranging cultural events, and information on study programs (Bacher et al., 2020; Bruton et al., 2019; Détourbe & Goastellec, 2018; Jungblut et al., 2020; Streitwieser et al., 2019).

Inclusiveness in context of refugee higher education is however more than initiatives at some universities. It is intertwined into political, social, and economic arrangements in different countries and can be seen from the wider migration and integration politics as Morrice (2013) states,

The subjective experiences of refugees in HE are inextricably linked to the wider political and economic framework and the objective social reality of global inequality...HE through economic discourse ... compete for and welcome some migrants (international students paying overseas fees) as desirable and worthy subject of support and attention, while ignoring and rendering invisible less desirable migrants: refugees (p. 667).

Therefore, isolated initiatives of individual institutions — though still very important — should not be taken as the real picture of refugee higher education landscape in a given context. Universities are not immune from the impacts of restrictive social and economic policies at national level (Goastellec, 2020). Many politicians view refugees as “illegitimate...who are looking for social welfare” and as receivers of better social assistance than citizens of host countries (Petsinis, 2019, p. 222). As a result, it is not uncommon to perceive refugees as burden on the welfare in many countries — including Norway (Friberg & Midtbøen, 2018). Such perceptions lead to formulation and implementation of policies which favour economic self-sufficiency of refugees through rapid employment than their participation in higher education (Perry & Mallozzi, 2017). Moreover, today’s universities play key role in widening socio-economic inequalities, facilitating neoliberal principles of competition, promoting monetary reward-oriented admission and retention processes, and adopting performance-based operations (Holmwood, 2011; Reay, 2011). Higher education provision framed within universities espousing these values is not sustainable, at least from refugee higher education perspectives (Yayboke & Milner, 2018).

Thus, the future education must be provided within socially inclusive system, which focuses on participation and empowerment of refugees. However, little is known regarding social inclusiveness of higher education systems to refugees in various countries. This article will increase our understanding of the situation in Norway in this regard. To this end, the article addresses the following two interrelated questions.

1. How is social inclusion (of refugees) framed within integration and higher education policies in Norway?
2. What characterizes universities’ policies and practices in relation to social inclusion of refugees into higher education?
1.1. Refugees in Norway

Refugees in Norway have arrived from various countries due to conflict and political persecutions. Chile, Vietnam, Iran, Sri Lanka, Bosnia-Herzegovina and Yugoslavia were the main origin countries in the 20th Century (Henriksen, 2007). In recent times, refugees came from Afghanistan, Eritrea, Iraq, Russia, Somalia and Syria (Østby, 2016). As of 01 January 2021, there were 240,239 people with refugee background living in Norway, which accounted for 4.5% of the Norwegian population (Statistics Norway, 2021). In 2004, the Norwegian government launched the Introductory Act, which required refugees to make active efforts “to qualify for participation in the life of work and society” through participation in the introduction program (Brochmann & Hagelund, 2012, p. 193). Adult refugees, who often come to Norway with little education (or less relevant education or low-quality education (Hardoy & Zhang, 2010)), may benefit from attending education in Norway since it can “improve their chances of finding work” (Næsheim, 2016, p. 46). Refugees can take a not means-tested loan from the State Educational Loan Fund to pursue higher education. Some of the loan may be converted to a grant after successful completion of the studies (Opheim, 2004).

2. Theoretical Framework: Social inclusion theory

Inclusive higher education is more than just granting access to universities and colleges. Access to higher education is only the first step in social inclusion of refugees into higher education (Gidley et al., 2010a; Mestan & Harvey, 2014). Gidley et al. (2010a) argue that social inclusion can be understood through three dimensions: access, participation, and empowerment. The access aspect of social inclusion is rooted in neoliberal ideologies of investing in human capital and improving skills primarily for the sake of a nation’s economic competitiveness (in the global market). The focus is generally on increasing enrolment in higher education, which is based on competition where “the best and the brightest” are selected and a group of people in society may be regarded as “disadvantaged and with particular needs” (Gidley et al., 2010b, p. 11). The participation dimension is a more inclusive interpretation of social inclusion and is embedded in social justice principles. Although the economic goals are not irrelevant, the main purpose of this dimension is to enable full participation of people in society through equal opportunities, fairness for all, and respect for human dignity. Nunan et al. (2000) argue that this type of inclusion is concerned with “successful participation which generates greater options for all” based on “the basic human values of participation, democracy, [and] equality” (p. 65). Finally, the empowerment dimension, embedded in the ideology of human potential, focuses on maximizing the potential of individuals by addressing issues of power and dominance in society. It is based on the idea that all human beings, irrespective of their socio-economic and cultural backgrounds, are “multidimensional beings, who have needs and interest that go well beyond their role in the political economy of a nation” (Gidley et al., 2010b, p. 14). In contrast to the neoliberal oriented access dimension, the empowerment aspect regards “strength-based and value difference and diversity as an important resource or source of social transformation” (Kilpatrick & Johns, 2014, p. 30).

3. Methodology

This article is based on a critical constructivist qualitative research involving policy documents and a mix of semi-structured interviews as well as institutional documents.

3.1. Documents

To address the research question at macro policy level, I used three White Papers — see Table 3.1— related to Norwegian integration and higher education. Even though the government is the main actor in creating the policy documents, the contributions of different societal groups are significant in finalizing them (Hilt, 2015). Higher education and integration policy documents need to be critically analyzed to unearth the social (in) justice refugees face in relation to higher education (Saldana, 2012) in Norway. All the three documents were downloaded from the official Norwegian government’s website.
Table 3.1: Policy documents considered for analysis at national level.

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
<th>Date</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP30 (2016)</td>
<td>Fra mottak til arbeidsliv – en effektiv integreiringspolitikk (From reception to the labor market – an effective integration policy)</td>
<td>May 2016</td>
<td>- The Conservative and Progress parties coalition government &lt;br&gt; - A response to the 2015 and 2016 refugee incident</td>
</tr>
</tbody>
</table>

Table 3.2: Institutional documents considered for analysis at institutional level.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Documents and website entries used as data sources</th>
</tr>
</thead>
</table>

3.2. Semi-structured interview

In addition to the documents mentioned above, I gathered data through face-to-face interviews with experts at two public universities: University of Bergen and University of Oslo. Qualitative interviews are generally more favorable data collection methods in studies that require probing to obtain detail information (Walliman, 2011). Having obtained the email addresses of the relevant experts from the universities' websites, I sent emails requesting them for interview. I began the interviews by briefly introducing myself, explaining the aim of the interview, and requesting permission to audio-record the interviews. I ended each interview by “debriefing”, asking the participants if they had anything to say (Kvale, 2007, p. 56). The interviews were conducted in January 2018 and May 2018. The average length of the interviews was 70 minutes. I took fieldnotes throughout the interviews to document contextual information (Phillippi & Lauderdale, 2018).
3.3. Data analysis

I chose two main data analysis methods in this research: critical discourse analysis and thematic analysis.

3.3.1. Critical discourse analysis

Discourse analysis is an umbrella term with different connotations and purposes depending on the context of inquiries (Cohen et al., 2018). It may be used as a “method of analysis... theoretical, and analytic principles...” (McMullen, 2011, p. 205). I chose CDA in this article to analyze policy documents because the combination of a linguistic analysis with a social analysis makes a CDA “a particularly useful tool for policy analysis in comparison with other approaches” (Taylor, 2004, p. 436). I drew on a CDA approach developed by Norman Fairclough mainly because this approach deals with dialectical relationships between discourse and social practices (Fairclough, 2003, 2013). Fairclough (2003) defines CDA as “... analysis of the dialectical relationships between discourse...and other elements of social practices” (p. 205).

The process of policy documents analysis in this research was based on semiotic aspects of CDA: genres and discourses (Fairclough, 2013). Genres are the ways of acting, of producing social life. Discourses are the particular ways of representing certain aspects of the world. The analysis conducted on the White Papers followed a three-step approach. First, the “relevant” policy documents were selected from numerous documents based on the contents of the documents as well as on the rationales mentioned for selection of the documents (Fairclough, 2013, p. 237). Second, an entry-level analysis was conducted (Krzyzanowski, 2013). After reading the entire documents (WP07, 2015 & WP04, 2018) and the relevant parts of WP30 (2016, pp. 7-15, 51-72) for a general understanding, words, phrases, sentences and even paragraphs were categorized into particular genres and discourses subthemes. Finally, in-depth analysis was made where the identified major genres and discourses were related to the social inclusion dimensions mentioned above (section 2). The line of argument for the dominant, and hence, marginalized, discourse in the text was traced and linked to the overall social practice (Fairclough, 2013) in the context of social inclusion of refugees into higher education.

3.3.2. Thematic analysis

In addition to CDA, I employed thematic analysis. Thematic analysis may be understood here as “a method for identifying, analyzing and reporting patterns (themes) within data” (Braun & Clarke, 2006, p. 79). I undertook a step-by-step analysis of the data set following the six steps developed by Braun and Clarke (2006). First, I began familiarizing myself with the data during the early data collection phase by transcribing the interviews verbatim and reviewing the documents. Second, I coded the data manually by assigning words or phrases to parts of the data (Leavy, 2017). The voluminous data set was reduced and classified during this phase but was not sufficiently organized enough into clear patterns or categories. Therefore, I grouped the initial codes under broader themes using axial coding (Merriam & Tisdell, 2016) to search for meaningful themes (Braun & Clarke, 2006). Third, I compared and contrasted various codes and regrouped them into fitting sub-themes and themes, and I established overarching themes by sorting and collating all relevant coded data. Fourth, I iteratively reviewed the themes to ensure that each identified theme worked in relation to the coded extracts and the overall data set. Accordingly, there were some themes which were not supported by enough data and therefore had to be discarded from the analysis. Similarly, there were other themes which were merged to form new themes. I established the validity and relevance of the themes by comparing them against the entire data set under analysis (Cohen et al., 2018). Fifth, I defined and refined the themes identified to capture the essence of each theme and determine what aspect of the data each theme depicts (Braun & Clarke, 2006, p. 92). Finally, I produced a report including a separate section with “Findings” as heading. In “Findings” I showed how each theme and category was backed by sufficient evidence by using verbatim quotations of interviews and extracts from the data set.
4. Findings

4.1. National level integration and higher education policies

The critical discourse analysis of three White Papers shows the following findings categorized under two major themes: genres and discourses.

Genres

A mix of policy, promotional, and managerial genres is drawn upon in the White Papers. It may be intriguing that the promotional and managerial genres are prevalent in what are otherwise political documents. However, it is not surprising because many discursive activities in the “customer culture” of today incorporate promotional elements (Bhatia, 1997, p. 635). Hence, the governments tend “to act like a corporation” and exert influence through managerial, rather than political, means (Fairclough, 2013, p. 385). In higher education context, this may lead to marginalization of social justice and empowerment principles by focusing on economic and labor market issues.

The hybrid genres embedded in the documents imply various ways of presenting social activities. From the outset, the “blurb” on the cover pages shows a sense of genres (Fairclough, 2013, p. 268). The colorful pictures at the bottom of the cover pages of the documents, which are placed presumably to attract the attention of the readers, give the documents a flavor of promotional or advertising genre. For instance, the cover page of WP30 (2016) depicts many working people, where out of the 17 pictures of adults on the cover page, 13 are working while two are receiving services and the remaining two are anonymous. From this, it seems that the Government promotes the notion that labor market participation is the main focus of its integration policy. Words and phrases such as “[r]eport to the Storting (white paper)” and “policy” indicate the presence of policy genres in the documents (Krzyzanowski, 2013).

Discourses

One of the discourses embedded in the documents is the political discourse manifested through future-oriented expressions (van Dijk, 1997). “The Government is working...to examine the future...” (WP07, 2015), “The Government has high ambitions as regards the Norwegian knowledge society” (WP07, 2015), and securing the economic sustainability of the welfare state “...all who live in Norway...pay taxes...to sustain economic suitability of the welfare society” (WP30, 2016). The modernization discourse is also embedded in the education policy documents, “...new care facilities...”, “...new technology...” (WP07, 2015), “...advanced IKT-competence...” and “digitalization” (WP04, 2018). The other prevalent discourse in the education policy documents is the internalization or globalization discourse, “The Government proposes...leading global expertise based in Norway...”, “...the Government wants Norway to be...world's most talented students and researchers want to go” (WP07, 2015), “Norway shall have world-leading expertise...”, “Global leadership...for economic development in Norway...” (WP04, 2018).

Exclusionary discourses are other important elements in the documents worth noting. Saff (2001) states that exclusionary discourses are expressed in subtle ways such as categorizing people into different groups, where some are considered superior and others, often by implication, inferior. For instance, “The best and the brightest...”, “...attract the best students and researchers...”, “...attract and develop the best talent...” (WP07, 2015), “...the best and most motivated students...” (WP04, 2018). The social justice and inclusion discourses are also embedded, albeit superficially, in the policy documents launched after the 2015 refugee crisis, as seen in the following: “An effective integration policy shall contribute...where all are given opportunity to be successful” (WP30, 2016), “The education system...higher education and research, has an important role to play in...inclusion...” (WP04, 2018). These discourses appear, however, in broader neoliberal discourse of labor market participation, which are more common in the documents, “The government will work...to facilitate transition to work among immigrants with refugee background” (WP30, 2016), “A successful integration policy...different immigrants groups participate in...work life...” (WP04, 2018). More specifically, refugee higher education or qualification is framed within the labor market demand. “Many immigrants with refugee background who already have education, may need more education to qualify for the Norwegian labor market” (WP30, 2016).
4.2. Institutional level policies and practices

In this subsection I focused more on initiatives that could have facilitated the social inclusion of refugees, had the universities taken them.

**A dearth of policies on the refugee social inclusion in universities’ strategic plans**

Neither UiO nor UiB has an explicit institutional level policy dedicated to the social inclusion of refugees. A recent strategy document from UiO (Strategy 2030) makes no mention of refugees despite stressing the importance of diversity and inclusion at institutional level. It states that the university will continue to recruit students with minority backgrounds in accordance with an “active equal opportunity policy and a recruitment practice that creates diversity and ensures equal rights”. The university’s action plan (2018-2020) does not include the word “refugee” either (Documents, UiO). Similarly, UiB has no concrete policy on the social inclusion of refugees at institutional level. However, UiB is a step ahead of UiO insofar as it mentions refugees as target groups in its Diversity and Inclusion Action Plan (2017–2020), which focuses on activities that the university plans to undertake to promote equality and diversity. The university’s Action Plan for Internationalization (2016–2022) also mentions refugees as a priority area for internationalization. Nevertheless, concrete actions to realize the plans remain to be seen, as no new initiatives have yet been established at an institutional level (as of June 2021). This highlights many potential areas exist which universities can focus on to become more inclusive (Nunan et al., 2000).

**A lack of bridging program for refugees**

Although the universities are aware of some of the challenges refugees face in accessing and succeeding in higher education in Norway, they do not create initiatives to alleviate such challenges. However, the universities do acknowledge the necessity to design special programs to facilitate the transition of refugees to higher education, partly to fulfill international duties and equality principles.

...we haven’t found solutions ... we are trying to find ways to make it easier to bridge competences...they need something extra to be able to apply for masters, we are trying to find ways of giving access to courses to enable people take university courses while they are still in the introduction program. (Interviewee, UiO).

...we don’t have any...special program to offer [to refugees]; and this makes recruitment more difficult because...you [as a refugee] will still need to meet the requirements as every student or applicant with a Norwegian [as mother tongue]. (Interviewee, UiB)

The respondent from UiO highlighted the fact that some refugees struggle to adapt to the academic environment at the university, particularly regarding academic text production. However, the university provides no help to mitigate this challenge. Considering this, the respondent suggested that “some kind of bridging [course] is important”. To establish such courses, refugees first need to be identified as a unique group of students, not because they are less intelligent but because they have “specific experiences that make access to and participation in higher education distinct for them” (Ramsay & Baker, 2019, p. 65).

**Refugees as an invisible group of students**

The universities report that it is impossible to track refugee students on campuses, as it is illegal to register students by immigration status. The only sources of information regarding immigration status are the refugees themselves. This has resulted in the standardization of services for all students, irrespective of their background, and a failure to offer refugee-oriented services on campuses. Due to this invisibility of refugees as a group of students, the universities have no special windows or service centers targeting refugees. Consequently, refugees must take the initiative to obtain the assistance they need, which may not always be available.
...they [the refugees] will go to the same places as everybody and ... if they tell us their background...then we will try to provide what we can and for instance... information services. A lot of people with refugee background will come and say, ‘I am a refugee, I am not sure how to do this, can you help me?’, so, we [then only] know but we will not keep the record (Interviewee, UiO)

The failure to distinguish refugees as a target group that faces specific challenges in pursuing higher education may downplay any possible future efforts of the universities in alleviating those challenges. The lack of English language courses specifically for refugees is an example of this failure.

**A lack of English language courses for refugees**

Refugees in Norway face double challenges concerning language because they must document both Norwegian and English language proficiency to gain admission to universities in Norway. Thus, English is as important as Norwegian for refugees who want to pursue higher education. The respondent from UiO stated,

...the most important thing is English. I cannot stress that enough. If refugees with a bachelor...got access to English first, then they could...take courses that could qualify them [for further studies] while they are still in the introduction program.

Although, the universities are aware of how challenging the English language is for many refugees, there are no English language qualification programs at the universities targeting refugees who aspire to pursue higher education in Norway.

...as we also see...many immigrants these days come from the Middle East, they also have [to document] the English requirements, so it is an obstacle...to be qualified for higher education admission... (Interviewee, UiB).

At least two factors make this challenge even more complicated. First, refugees do not receive adequate information on the English language requirement for accessing higher education in Norway. Second, it seems from the interviewees' responses that policy makers do not heed the seriousness of the challenge and, as a result, fail to address it.
5. Discussion

5.1. Integration and higher education policies

The Norwegian integration and higher education policies are interlinked, which is also the case in some other countries (Détourbe & Goastellec, 2018). The labor market participation of refugees is highlighted as a key factor for the integration of refugees. Hence, refugee (higher) education or qualification is framed within a broader goal of increasing refugees’ participation in the labor market. The emphasis is on human capital development when it comes to refugee higher education; and this reflects neoliberal principles which is a trend in the current global education policy (Convertino et al., 2017; Molla, 2014). Seen through the lens of social inclusion theory, the interdiscursive analysis of the documents indicates that the access dimension of social inclusion (Gidley et al., 2010a) is a prime focus of the Norwegian higher education and integration policies. In addition to this, the Government plans specific research and higher education focus areas along with ways of having qualified personnel to achieve specific goals. The Government’s ways of acting in this context are managerial or in Fairclough’s (2013, p. 177) terms, “business practices” which are the elements of neoliberal principles (Bagley & Beach, 2015).

The Government emphasizes sustaining the Norwegian welfare system through high employment, a robust economy, innovation, as well as commercialization of higher education and research. Higher education and research system are expected to focus on producing qualified professionals who can serve the “knowledge society” now and in the future. The discourses in the documents also indicate that the Government is investing in modern and advanced technologies to increase the competitiveness of Norwegian economy. Hence, it is possible to argue that Norwegian higher education and integration policies are rooted in neoliberal principles, where the Government is interested in ensuring the availability of sufficient qualified personnel for economic development, quality public service, and to meet demands of the labor market. This is in line with Fairclough’s (2013) argument that nowadays there is a tendency to narrow down the purpose of education “towards serving the needs of economy” (p. 557) instead of, for example, envisioning education for life (Bak, 2018).

Moreover, the Government seeks to create a world-class competitive academic community by attracting the world’s best students and researchers, who can then contribute to strengthening the international competitiveness of Norway. This highlights that the access dimension of social inclusion is an underlying principle in the internalization process of Norwegian higher education and research. This supports findings of a study from Germany that indicates that widening participation in Germany is associated with the aim of securing a “pool of skilled” labor to “strengthen the international competitiveness of Germany as a location for science” (Mergner et al., 2019, p. 64). The focus on “the best and the brightest” may constitute an exclusion discourse through which the privileged groups in society become the beneficiaries by accessing and succeeding in higher education, thereby reproducing social inequalities.

The presence of social justice discourses in the policy documents raises optimism regarding inclusiveness of higher education system in Norway. However, the social justice discourses are marginal and dominated by neoliberal principles that they may not have the desired positive impact in advancing social inclusion of refugees into higher education currently. It is noteworthy that when policies informed by human capital development call for inclusion, “the primary concern is loss of productive workforce, not social justice as such” (Gale & Molla, 2015, pp. 819-820). The policy documents’ skewed focus on the access dimension of social inclusion may in practice affect a wider approach to social inclusion of refugees into higher education by limiting potential interventions to mainly one dimension of social inclusion. One of the areas where this may take effect is the practices of universities.

5.2. Higher education institutions’ policies and practices

Examined in light of the social inclusion theory, the universities have not adopted a complete approach to even the narrowest dimension of social inclusion — the access dimension. This is evident from the absence of a bridging or enabling program, which is one of the most common initiatives at many universities in other countries (e.g. Bacher et al., 2020; Détourbe & Goastellec, 2018; Jungblut et al., 2020; Streitwieser et al., 2019). A bridging program is a sustained, proactive special program, comprising different courses and activities organized to achieve the specific goal of facilitating refugees’ successful transition to higher education. It is one of the focus areas of the access dimension of social inclusion theory and often includes language courses, academic writing and literacy skills, study and time management skills, acculturation to a university culture, and advice on academic and social issues.
The findings also indicate that refugees are not a target group of any diversity policies or practices at UiO; and although, UiB mentions refugees in both its diversity and inclusion as well as internationalization action plans, it has not yet (June 2021) implemented concrete measures on campus to help students with refugee backgrounds. The failure to provide supportive initiatives specifically targeting refugees leads to standardized services for all students, irrespective of their experiences or background. Naidoo et al. (2018) recommend that universities should abandon a “one-size-fits all approach and understand the nuanced experiences of all students” to ensure success of students with refugee background (p. 160). This analysis corroborates a similar study from Australia (Dunwoodie et al., 2020), which indicates that students of asylum-seeking background are not recognized by policies at institutional level. Hence, “many [of the students] fell through the cracks when it came to a recognition that their differences required a redistribution of material and economic services in order to achieve participatory parity with other students”. Put differently, the cultural misrecognition of the students impedes their full participation in higher education (Dunwoodie et al., 2020, p. 259). Hannah (2008) argues that while universities’ avoidance of the term “refugee” may stem from a legitimate desire “not to separate out or stigmatize those from migrant and refugee backgrounds”, it also “results in an absence of any acknowledgement of the specific problems that such students may face” (p. 45).

6. Conclusion

This article addresses two interrelated questions dealing with the conceptualization of social inclusion (of refugees) in integration and higher education policies in Norway and characterization of universities’ policies and practices in relation to social inclusion of refugees into higher education in Norway. The Norwegian integration and higher education policies are informed mainly by human capital development for the purpose of economic competitiveness, labor market participation, and sustainability of the welfare system. This may be translated as the access dimension of social inclusion, which is the narrowest dimension of social inclusion (Gidley et al., 2010a). The already meager social justice discourses in the policy documents are further marginalized by the dominant neoliberal principles. The absence of a holistic social inclusion strategy in the policy documents — and by implication, the lack of a comprehensive social inclusion policy at national level — hinders the full participation of refugees into higher education. This implies a huge potential for improvements at national level to create more inclusive universities through social justice informed integration and higher education policies.

At institutional level, the absence of clear social inclusion policies, programs that provide complementary courses including English language as well as the invisibility of refugees as equity target groups all indicate the social inclusion of refugees into higher education is not a current concern. Moreover, this points out to how little universities do to directly facilitate the transition of refugees into higher education or increase their participation and empowerment on campuses. Social inclusion may have diverse connotations and levels of implementation. Therefore, it is not necessarily limited to the institutional-level activities and plan of universities. However, social inclusion activities may be less sustainable if they are not adequately supported at “the highest level of university, by articulation in strategic or other high-level university plans” (Kilpatrick & Johns, 2014, p. 42). Universities need to consciously move toward inclusiveness by taking various initiatives embedded in social justice and human potential principles. The future research may focus on more diverse higher education systems, preferably in comparative ways, to analyses factors influencing inclusiveness at various levels.

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Elements and patterns of adolescents’ reasoning skills in argumentative writing

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Abstract

Education should not be delivered in the future. The word deliver has a connotation that precious knowledge has been carefully packaged and transferred to a selected educator, who decodes the ancient treasure box for an eager crowd. This model may not fit well today when pieces of information are mass produced and pushed to your screens. Young people nowadays are born and raised among controversies, with avid supporters of different views. Questions with opposing perspectives are prevalent, such as Is the earth getting warmer or Do we need to keep wearing masks after vaccination. I argue that the field of education should invest in the arts and sciences of handling controversies. In this article, I review my study on adolescents’ argumentative writing and discuss the pedagogically relevant findings. I studied a diverse group of 11-to-14-year-old students in the U.S. (N = 363) who wrote responses to a school-relevant dilemma. I used qualitative discourse analysis to investigate the students’ argumentative moves when they tried to persuade an authority and their peers. I found that adolescents’ inchoate persuasion was solution driven, and that recognizing the logic of an alternative viewpoint or even acknowledging its existence was challenging but emerging. Before directly acknowledging the opposing position, young adolescents utilized a contingency, concession, solution, or critique about the opposing position as approaches to strengthening their own position. I identified essay profiles at four argumentation complexity profiles: Basic Argumentation, Solution-Driven Argumentation, Critique or Problem-Driven Argumentation, and Comprehensive-reasoning Argumentation. A deepened understanding of argumentation skills could support young people in becoming more discerning knowledge consumers. As we are entering the second quarter of the 21st century, it seems especially urgent to incorporate argumentation skills into the education agenda to encourage effective discussions and debates among future citizens with diverse cultural backgrounds.

Keywords:

Argumentation, Argumentative Writing, Discourse, Adolescents
Introduction

Argumentation is “the act or process of forming reasons and of drawing conclusions and applying them to a case in discussion” (Merriam-Webster, n.d.). Argumentative writing is a critical, if not decisive, factor in shaping a student’s academic opportunity via high-stakes assessments and educational standards. In the U.S., the Scholastic Aptitude Test (i.e., SAT), widely required for college admissions, includes evaluations of students’ familiarity with command of evidence and expression of ideas in argumentation passages (College Board, 2021). The Graduate Record Examinations (i.e., GRE) for master’s and doctoral program admissions expect students to insightfully examine aspects of the argument and to provide compelling support for main points in writing (Educational Testing Service, 2021). Even in the K-12 settings, the Common Core State Standards (CCSS, 2010) in the United States have required upper elementary and middle school students to produce structured argumentative writing. Similarly, students taking the Test of English as a Foreign Language (i.e., TOEFL) are expected to exhibit their ability to express and justify their opinion on an issue to establish eligibility for studying at an English-speaking school (Educational Testing Service, 2021).

Although teachers and their students have been aware of the high stakes associated with argumentative writing, its fundamental functions and values in the broader literacy environment have not always been made explicit to these stake-holders, especially for English-as-a-second or foreign-language (henceforth ESL/EFL) students growing up in native cultures where argumentation is not the mainstream communication mode in public, academic, or professional settings (Hornikx & Best 2011; Mercier et al., 2016; Uysal, 2012). The mere fact that students are encouraged to pass an argumentative writing exam does not make clear what it is good for, what makes it special compared with other types of writing, and why one has to bother to write in this way. Furthermore, most standardized examinations adopt broad rubrics to assign one score representing an essay’s overall writing quality, without information on which part of the essay contributes to which part of the score. This traditional approach to scoring argumentative writing quality is reliable in categorizing students at different skill levels but does not help teachers provide differentiated feedback to individual students.

Therefore, this article is meant to serve as a resource for teachers and students who need a more detailed analysis of argumentative writing. In the first section I explain the relevance of argumentative writing to students’ lives to highlight the potential for intrinsic motivation for mastering this genre. Then, I review an empirical identification of the elements of adolescents’ argumentative writing discourse and how the constellation of elements indicates an essay’s structural complexity levels, together with their implications for English language classrooms. In the second section I provide teachers and students a lens to identify the building blocks of argumentation, as a way to provide constructive feedback or self-guided improvement. In the last section, I discuss some future directions for research on argumentative discourse and its broad implications to education policy.

Why Do We Need Argumentation?

Argumentation as an Educational Tradition

Argumentation has been a feature in the process of scholarly thinking and policy making in human history. However, argumentative writing is a requirement only recently imposed on young adolescents. Indeed, until the Common Core State Standards (CCSS, 2010) set explicit expectations for elementary school children, students in U.S. public schools had not been expected to demonstrate full argumentative writing skills until high school or college (McCann, 1989). Of course, argumentation has been a feature of human societies for thousands of years (e.g., Schwarz & Baker, 2017; Tillemans, 2008; You, 2010, etc.). Argumentation is the formal presentation of argument. The etymology of the word argument indicates a sense of “statements and reasoning in support of a proposition or causing belief in a doubtful matter”, originating from 13th-century Old French argument meaning “reasoning, opinion” as well as from Latin arguere meaning “make clear, make known, prove” (Oxford English Dictionary, n.d.). Oral argumentation has a long history in various cultures. For example, in ancient India, argumentation tournaments were the major approach to evaluating Buddhist monks for rankings and honors. Greek philosopher Aristotle identified the goal of argumentation as convincing the audience to adopt the writer’s side of the issue, using an array of approaches such as ethos (i.e., credibility of the writer or the resources that the writer used), pathos (i.e., appealing to the audience’s emotions), and logos (i.e., appealing to the audience’s logical thinking). Chinese ministers would frequently engage in argumentation, such as the famous debate on “Should salt and iron be open to private business or kept being controlled by the government” between Minister Sang Hong-Yang and Confucian scholars in 81BC.
The Absence and Re-Emergence of Argumentation in Education

As shown in the examples, oral argumentation has served the purposes of clarifying philosophical thinking, justifying a person's position, or informing political decision making. In light of this long history, it is puzzling that argumentation is only recently emphasized in U.S. public schools. One possible explanation is that the population of those receiving post-primary education has changed, as has the economic structure of human society and its corresponding literacy requirements (Brown & Lauder, 1991; Schultz, 2000). In ancient times, only a small fraction of society, typically boys from aristocratic families or those who aimed to join the government or church, had the privilege of learning how to read and write. Argumentation was included in the curriculum and instruction designed for this group would include preparation for their future roles as leaders. However, the current U.S. K-12 public education system was not founded on this tradition of training leaders. Instead, public schools designed to respond to the demands of industrial revolutions. The economy called for qualified workers who could operate complicated machines or conduct clerical works in large-scale factories, which required basic literacy skills to recognize and understand mechanical instructions.

Possibly based on these reasons, basic reading and writing was established as the priority of literacy education for the general population. More sophisticated literacy skills such as argumentative writing were reserved for students in higher education and the college preparatory schools. It was only toward the turn of the 21st century that high performance in argumentative writing was explicitly expected for younger public school students, when policy makers and educators updated the education agenda to produce more discerning consumers of knowledge, a more innovative workforce for a transforming economy, and more equal opportunities in the society (CCSS, 2010). Indeed, the traditional focus on basic reading and writing was ill designed to meet progress in information technology. Nowadays, pieces of information from various sources are produced and immediately pushed onto screens. Questions with opposing perspectives are prevalent, such as Is the earth getting warmer? or Should we hold the summer Olympics games during a global pandemic? Young people are born and raised among avid supporters of opposing positions, whose voices are amplified and echoed on social media. Without the thinking and communication skills that match this complexity, it is easy to fall victim to biases or unfruitful quarrelling. In response to these unprecedented challenges, the field of education is investing in argumentation training.

Just as written language derived from oral language, argumentative writing can be viewed as a re-organized and synthesized print form derived from oral argumentation. Argumentative writing has unique characteristics compared with other genres. First, it is anchored in a controversy or a dilemma that needs to be solved. It differs from narrative writing, which focuses on describing a sequence of events or psychological movements, and from informational writing, which focuses on reporting or explaining a phenomenon or mechanism, as shown in the following examples.

- **Narrative:** Mary bought 500 masks out of an abundance of caution in the beginning of the pandemic.
- **Informational:** A surgical N95 is recommended only for use by healthcare personnel who need protection from both airborne and fluid hazards (cite: CDC website)
- **Argumentative:** Should Mary donate her masks to healthcare personnel who did not have sufficient personal protective equipment? I think that Mary should because...

Second, although some argumentative writing is based on abstract topics (e.g., the philosopher’s Is honesty the most important virtue?) or everyday dilemmas (e.g., Should I order that fried chicken after midnight? written in a personal diary), some arguments have concrete consequences in the larger world. A court's decision evaluating a dispute between a plaintiff and a defendant may fundamentally change the well-being of future generations. In the field of education, for example, the U.S. Supreme Court’s decision in the Brown v. Board of Education (1954) case that ruled racial segregation in public schools unconstitutional paved a path towards education equality and other civil rights nationwide. If the argumentation had come to a different conclusion, millions of students would have had a different educational experience.

As illustrated above, argumentative writing is unique in enabling decision making by explicitly analyzing controversies from multiple and varied perspectives. The different decisions could have led to parallel universes, such as one where Black and White students studied at separate schools. Given the potential consequences of good arguments, it is not surprising that future leaders received training in producing them.
However, the centrality of argumentative writing may have not been salient to students who need them for accessing more educational and professional opportunities. Students from families with diverse socioeconomic status or ethnic-cultural backgrounds may have different levels of familiarity with argumentation when growing up. Sociolinguistic research has found that parents in working class families were more likely to use direct instructions when talking to their children and to value conformity (e.g., Don't eat this. Bring me that); whereas parents in middle class families were more likely to encourage challenge to question, challenge, and form their own opinions (Kohn, 1963; Lareau, 2011). Students whose home culture values obedience to authority may see argumentation as disrespect (Wu et al., 2000). These students would need more scaffolding on the functions and values of argumentative writing when they encounter this task in the English classrooms.

Furthermore, argumentative writing may seem even more distant and less relevant to students in English-as-a-foreign-language classrooms within broader social contexts where argumentation is not highly visible, or the writing culture values poetic expressions or metaphorical interpretations more than evidence. For example, the writing prompt in the 2021 college entrance examination on Chinese Language Arts administered to more than 550,000 high school senior test takers in three mainland China provinces (Chinese Ministry of Education, 2021) presented a sheet of traditional Chinese calligraphy for the character “human” (i.e.,人) including instructions on how to accomplish this character beautifully such as to “hide the initial stroke”, “proceed in the middle”, and “linger and slowly conclude.”. Given the focus in K-12 education on preparation for high-stakes summative examinations, the literacy instruction that students receive heavily emphasizes this style of writing. A high school student or college freshman who has been immersed in a non-argumentative writing curriculum since kindergarten is likely to be confused about what would constitute a high-quality argumentative response to a TOEFL writing prompt such as Should television advertising directed toward young children be allowed?

**Argumentative Writing as a Personally Relevant Skill in Student Life**

In addition to explaining the importance of argumentation in public communication, teachers can frame argumentative writing as a thinking tool. Even when public discussions over high-stakes controversy are not prevalent in a family, community, or society, decision making is still going on. The skill of drawing a conclusion to controversies and dilemmas is highly relevant to a students' life. For example, an elementary school student may need to decide between an outdoor camp or a reading program for the summer. A high school senior may come across questions such as Which major should I study in college: computer sciences, art history, or economics? A college graduate may have to choose among opportunities such as joining the government, working in the private sector, or going to graduate school, which respectively have their pros and cons. Moreover, as today's students grow into leadership positions, their decisions may be crucial for the well-being of others. The skills to facilitate the decision-making process can be trained through argumentative writing, in which the thinking process is visible and editable.

In order to better facilitate students' argumentative writing, it will be helpful for teachers to know the elements that constitute argumentative writing, and how students are doing in producing these elements. Therefore, the next section will provide teachers an analytical system to help with this process.

**Method**

**Identifying Argumentative Elements in Writing and Their Patterns**

Analyzing the elements in adolescents' argumentative writing and describing students' success at producing these elements was a multi-stage process (Deng, 2021). In this section I introduce how adolescent students were tested and how I analyzed their essays using a labelling system I developed called **Argumentative Element Coding Scheme (AECS)**. Then, I report the instruction-relevant patterns revealed by applying the AECS to students' essays and discuss their implications for educators.
Participants and Texts

A total of 363 students participated in the current study. These students were fifth-to-eighth graders from Title 1 urban public schools in the Northeastern and Mid-Atlantic regions of the United States. Title 1 schools receive U.S. federal funds to support economically disadvantaged students. About half of the participants were female. About two-thirds were eligible for free/reduced-price lunch, indicating that their families were below the poverty line. I focused on students' responses to one writing prompt administered at the end of spring 2014. The writing prompt was: Should we allow iPads in our classrooms? The writing task was developed by the IES-funded Catalyzing Comprehension through Discussion and Debate (CCDD) team (Jones et al., 2019; LaRusso et al., 2016; Lawrence et al., 2015; Snow et al., 2009) to assess upper elementary and middle school students' writing. Students were given 20 to 25 minutes to write an argumentative essay. Students read an elaborated description of why iPads had been popular at school and why they were subsequently prohibited. The school principal had decided to rescind the school's policy of providing iPads after incidents of cyberbullying. Students were asked to take a position and to write an argumentative essay to be published by their school newspaper, giving reasons to support their position, to try to convince people, to explain the impact on others, and to discuss potential alternative resolutions to the problem. Each student wrote one essay in paper-and-pencil format.

Prior to analysis, all the hand-written essays were transcribed to electronic format using the Code for the Human Analysis of Transcripts (CHAT) conventions (MacWhinney, 2000). All spelling errors were corrected in the transcribed essay data in order to assure that human scorers of writing quality were not negatively biased by non-relevant misspellings or other orthographic features. Original files with misspellings were also preserved.

Argumentative Element Coding Scheme (AECS)

I developed the Argumentative Element Coding Scheme (AECS) based on an integration of two lines of previous research: 1) research on argumentation structure that identified claim as the central argumentative move and a series of other moves (evidence, reason, and modifiers) that serve to support the claim (Toulmin, 1958/2003), and 2) research on argumentation perspectives which differentiated argumentative moves that clarified the writer's own position, the opposing position, and the writer's attempt to weaken to the opposing position (Kuhn & Crowell, 2011; Kuhn et al., 2016). The AECS included eight mutually elusive labels. The definitions and examples for the labels are:

- **Own Claim**: An assertion that declares the writer's own position without consideration of the opposing position, or a direct objection to the opposing position. (e.g., *iPads should be allowed in our school.*)

- **Mitigated Claim**: An assertion that declares the writer's own position with consideration of the opposing position, such as contingency or concession. (e.g., *iPads should be allowed in our school if students can follow the rules.*)

- **Counter Claim**: An assertion that declares the opposing position. (e.g., *Some people think iPads should not be allowed in our school.*)

- **Own Support**: The advantages of the writer's own position. (e.g., *We can make PowerPoints on iPads.*)

- **Solution Support**: Action plans proposed to solve a problem that may potentially be raised from the opposing position. (e.g., *We can block the bad apps on iPads.*)

- **Critique Support**: Negative consequences of the writer's opposing position. (e.g., *Students will be upset if iPads are taken away.*)

- **Counter Support**: Advantages of the writer's opposing position; disadvantages of the writer's own position. (e.g., *Some students play video games on iPads.*)

- **Other**: Non-argumentative or unclear utterances
A team of three research assistants applied AECS to students' essays. I focus here on results from the 363 affirmative essays (the writers favored allowing iPads). The research assistants processed each essay line-by-line. Each sentence or part of a sentence in an essay received one of the eight labels. After that, the presence of each label was summarized for each essay; the frequency of each label in an essay was not counted. For example, if a student produced one Own Claim, three different Own Support, two Critique Support, and no other argumentative elements, the argumentative elements in this essay would be summarized as: Own Claim + Own Support + Critique Support. Patterns of Argumentative Elements and Their Pedagogical Implications.

Results and Educational Implications

In this section, I focus on reporting and discussing the four most prevalent patterns in the essays, those most directly relevant to argumentative writing instruction.

Pattern I. Almost All Students Stated the Advantages of Their Own Position

Stating the advantages of their favored position was the most basic argumentation skill for this student group. Among the 363 students who had a clear affirmative stance, almost all (i.e., 92%) of them produced Own Support in their essay. The results suggest that the vast majority of students did not display difficulties in generating ideas about the advantages of their own position. Fifth-to-eighth grade teachers should feel confident that students who have stated their favored position would also tend to provide reasoning in support of their position. On one hand, this suggests that teachers probably do not need to spend much instructional time reminding students about articulating support in writing. On the other hand, even students who did exhibit challenges in writing down the advantages of their favored position probably possessed the thinking ability or logical competence to do so, but they might have faced challenges from other sources, such as gaps in background knowledge or lack of expressive vocabulary, to which teachers would need to pay special attention. Furthermore, teachers may also be aware that the generation of Own Support is not equal to its richness or quality. For example, even when almost all students were able to state at least one benefit of allowing iPads, some students may simply said We will feel happy to have iPads, whereas some students may have provided an organized list citing student motivation, environmental interests, and career preparedness, with detailed examples. In this situation, effective teaching might be geared towards enriching Own Support.

Pattern II. Many Fewer Students Acknowledged the Opposing Position

In contrast to the popularity of stating the advantages of their own position (i.e., the benefit of allowing iPads), many fewer students mentioned the fact that some people might take an opposite position on this issue and the reasons behind this opposing position. Only 29% of all students (n = 107) included Counter Support and only 12% (n = 42) stated a Counter Claim. The finding that very few students acknowledged the opposing position in their argumentation has a few implications for teachers. Although most students apparently knew that there were people who held opposing views, the students would not automatically include this information as construction material in their argumentation. It is possible that students deliberately avoided mentioning the opposing position out of the fear of weakening the legitimacy of their own position. It is possible that students assumed the readers of the essay had already understood the full background of the controversy and therefore an introduction of the counter claim was unnecessary. It is also possible that some students did not have sufficient knowledge or skills to integrate the opposing position into their argumentation; for example, they may have lacked the language to articulate which part of the opposing position was wrong. Yet another possibility is that it is unclear why Counter Claim or Counter Support is even helpful if a writer has made a clear decision. It would be helpful if teachers could conduct in-depth discussions with students to unpack the thinking processes behind writing. A few talking points that might be useful for the discussions are for many controversies, there are no right or wrong answer; therefore, analyses of different positions can help the writer to understand the various aspects of a complicated issue more deeply. Writers usually need to convince not only people who think similarly to them but those who think differently from them. By acknowledging the opposing position, it is more likely that people who think differently from you will pay attention to you and consider your views.
Pattern III. A Great Many Students Critique the Opposing Position or Provide Solutions with or without Acknowledging the Opposing Position

Although not many students explicitly acknowledged the opposing position itself, many students stated the negative consequence of the opposing position if it were to be accepted: 44% of all students ($n = 158$) stated Critique Support. 73% of all students ($n = 266$) stated an action plan (i.e., Solution Support) to a problem that people with the opposing position may have raised (i.e., Counter Support), even though the problem itself was sometimes not presented in the essay.

The finding that critiquing the opposing position was less challenging than acknowledging it was similar to what has been found in previous research (Kuhn & Crowell, 2011; Kuhn et al., 2016). Conventionally, to critique might have been considered as the focus of argumentation training in some curricula; however, the results showed that almost half of the students were able to generate critique suggests considerable cognitive ability in this age group.

The finding that about three quarters of all students provided solutions is worth attention from teachers. One interpretation of the result is that adolescents tended to take a pragmatic approach in argumentation, regarding solutions as the most powerful tool to convince a potential opponent. Another interpretation is that solutions are the easiest way for students to engage with the opposing position. No matter which interpretation is more plausible, it implies that teachers might consider using solutions as a preliminary learning objective when explaining how to tackle a different view in argumentation.

Pattern IV. The Argumentative Elements Indicated Essay Profiles at Different Complexity Levels

The percentages of students who produced a given argumentative element as reported above (i.e., Own Support: 92%; Solution Support: 73%; Critique Support: 44%; Counter Support: 29%) differed in incidence by about 15~20 percentage points; these differences were statistically significant. However, one might still ask if including a rarer element indicated a higher ability, or whether it just reflected some students’ idiosyncratic or random choices in writing. Therefore, I set up three criteria to examine if one element can be regarded as more advanced than another.

Taking the comparison between Own Support and Solution Support as an example, I regarded Solution Support as a more advanced element than Own Support based on the following three criteria.

1. Conceptual Distance. By definition, a solution is an action plan to address a problem, which people holding an opposing position would raise, as a means to strengthen their own position. For example, by stating We can block the bad websites on iPads, the student is addressing the problem of inappropriate information that iPads may bring, a reason for which some people may advocate banning the iPads. Therefore, Solution Support indicates that the writer is thinking beyond the realm of self and implicitly engaging with an invisible opponent.

2. Incidence Difference. Among all students, 73% of them ($n = 266$) produced Solution Support, and this percentage was statistically significantly lower than 92%, the percentage of students who produced Own Support. In other words, the different percentages pointed to a possibility that Solution Support is a more challenging element than Own Support.

3. Inclusion Indication. Among the 266 students who did produce Solution Support, the vast majority (90%) also produced Own Support in their essay. The 90% percentage was statistically significantly higher than chance (.5). In other words, if we saw Solution Support in an essay, we could be quite sure that we would also see Own Support in the same essay. An inference from the much-higher-than-chance percentage was that students who have produced Solution Support can be regarded as having already achieved the ability to produce Own Support, even though sometimes a student may have produced the former without the latter in an essay by chance.

I applied the same three criteria in comparing other pairs. I found that Critique Support and Counter Support were more advanced than Solution Support; Own Support was less advanced than all other types; Counter Support and Critique Support did not show a significant difference in the skill level they indicated.
Based on the established gradient, the student essays can be ranked at four complexity levels in their Support element combinations. There were 58 students (i.e., about 1/6 of all students) who produced Own Support as the only type of reason to justify that iPads should be allowed without displaying any consideration of the opposing position. For example, a student might write *I agree that we should allow iPads. iPads can help us learn better. We can do math and make Powerpoints on iPads. iPads are so great.* As shown in the last three sentences in the example, students consistently used iPads' advantages as the means to strengthen their point. Given the minimal elements included, this group of essays were summarized as:

**Level 1.**

Basic Argumentation: Own Claim + Own Support

About 1/4 of all students (*n* = 94) provided Solution Support but no Critique Support. It should also be noted that these students did not mention the problem the solution was designed to address. For example: *I agree that we should allow iPads. iPads can help us learn better. We can do math and make Powerpoints on iPads. Students will be very sad if we don't have iPads. We can just block the bad websites.* Strictly speaking, such an essay was logically incomplete by itself, missing a statement like ‘Admittedly, students may access bad websites. However, we can block...’. The essays were summarized as:

**Level 2.**

Solution-Driven Argumentation: Own Claim + (Own Support) + Solution Support

Note. The element in parentheses is optional, but its presence in an essay is statistically significantly higher than chance (.5)

About 1/3 of all students (*n* = 104) produced Critique Support but not Counter Support. A sample essay of this type would be: *I agree that we should allow iPads. iPads can help us learn better. We can do math and make Powerpoints on iPads. Students will be very sad if we don't have iPads. We can just block the bad websites.* The penultimate sentence pointed out a negative consequence if the opposing position won the argument, serving as a move from the writer to confront and attack the opposing position. About 1/6 of all students (*n* = 53) produced Counter Support but not Critique Support. For example, a student may write: *I agree that we should allow iPads. iPads can help us learn better. We can do math and make Powerpoints on iPads. Some students checked bad websites and picked up violent behaviors from them. We can just block the bad websites on iPads.* Compared with a Solution-Driven Argumentation essay, such an essay is more logically complete and coherent. Given Counter Support was not found to be more advanced than Critique Support, the two essay profiles of were merged as one complexity level:

**Level 3.**

Critique Argumentation: Own Claim + (Own Support) + (Solution Support) + Critique Support

Problem-Driven Argumentation: Own Claim + (Own Support) + (Solution Support) + Counter Support

Note. The element in parentheses is optional, but its presence in an essay is statistically significantly higher than chance (.5)

Finally, there were 54 students (i.e., about 1/6 of all students) who produced both Critique and Counter Support, the two most advanced Support elements.

**Level 4.**

Comprehensive-Reasoning Argumentation:

*Own Claim + (Own Support) + (Solution Support) + Critique Support + Counter Support*

Note. The element in parentheses is optional, but its presence in an essay is statistically significantly higher than chance (.5)
A bar graph showing the number of essays at each level forming a normal distribution (Shapiro-Wilk W test $p = .24$) is presented in Figure 1. Learning to assign essays to one of the four argumentation complexity levels would be helpful for teachers and students, as a scaffold for analyzing the essays critically. Teachers could use the categorization to identify students' accomplishments and likely next developmental steps, in order to set challenges at an appropriate level. For students, the ACES may be used as a thinking tool to help with the brainstorming, planning, and drafting phases in writing.

![Number of Essays per Argumentation Complexity Level](image)

**Figure 1: Number of Essays per Argumentation Complexity Level**

- **Level 1:** Basic Argumentation
- **Level 2:** Solution-Driven Argumentation
- **Level 3:** Critique or Problem-Driven Argumentation
- **Level 4:** Comprehensive-Reasoning Argumentation

**Limitations**

The analysis summarized here offers some answers but leaves open many questions about analyzing students' argumentative writing, and therefore caution is needed when using the results to inform pedagogy. First of all, the results reported only included essays with the affirmative stance; the analyses were focused on students' reasoning, that is, their use of the Support elements, rather than on the Claim elements. Second, it should be noted that essays included in the study were first drafts composed under one specific writing prompt with rich scaffolding. Students may behave differently with other prompts. Third, the study was conducted in U.S. public schools; students from different cultural, linguistic, and educational backgrounds may have different patterns in argumentative writing.

**Implications for Future Research**

The current study suggests a few directions for future research. First, new technology could be developed and applied to improve analytic efficiency. For example, machine learning and natural language processing tools could be trained with the qualitative coding scheme for speedy analyses of large quantities of essays. Second, more analytical approaches could be developed to identify argumentative elements from different angles, so that more nuance in writing could be revealed. For example, the types of evidence cited could be identified and writers' perceptions of what is strong evidence could be investigated. Third, studies could be conducted on writers from a wider range of age, linguistic, national, or cultural groups to describe the characteristics of argumentative writing in a broader population. The commonalities and differences among groups could be compared in order to raise people's awareness of how they think similarly or differently. It is the hope that miscommunication could be reduced and chances of effective negotiation could be increased.
Conclusion

I focused on the topic of argumentative writing in this article. I pointed out the essentiality of argumentative writing in adolescent students’ academic, social, and personal development, apart from its strong presence in high-stakes standardized assessments. I introduced the historical centrality of argumentation and argumentative writing for elite learners in ancient societies, and suggested reasons for its comparatively recent emergence in public education. I summarized findings from my study of fifth- to eighth graders in U.S. public schools designed to generate an in-depth understanding of argumentative writing. In the study, I applied the Argumentative Element Coding Scheme, which identified essay profiles at four argumentation complexity levels: Basic Argumentation, Solution-Driven Argumentation, Critique or Problem-Driven Argumentation, and Comprehensive-Reasoning Argumentation. I suggested that investment in argumentative writing training in the classroom is beneficial to students by helping teachers raise student awareness, especially for students from families or communities in which reasoned argumentation is infrequent. In an era when technology advances have enabled exponential growth in information dissemination efficiency, confronting individuals with numerous controversial and conflicting views, it is pressing to incorporate argumentation skills into the education agenda.

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Entrepreneurship pedagogy and higher education system: A critical appraisal with reference to entrepreneurship courses in select universities of Assam, India

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Abstract

“The entrepreneurial mystique? It's not magic, it's not mysterious, and it has nothing to do with the genes. It's a discipline. And, like any discipline, it can be learned” (Drucker, 1985). It is an established concept today that the behaviour of entrepreneurship is a learned phenomenon. Substantiated by enough literatures, this study advocates that a well-designed education system can generate effective and desired entrepreneurship behaviour. There is a pressing need to pay due attention to the teaching-learning methodologies adopted for imparting lessons on the subject. On the backdrop of the existing imbalance in demand and supply of entrepreneurs in developing economies like India, the study primarily focuses on examining the role of higher education in creation of entrepreneurs. Being the supreme authority of education, the Universities need to usher the fundamental role of developing an entrepreneurial economy where the individuals possess an entrepreneurial state of mind. The paper extensively discusses about entrepreneurship pedagogy as to a check on the gap that exists between what should be taught and what is being taught to the prospective entrepreneurs. Taking cue from several studies on global entrepreneurship programs and courses, the study also throws light upon the expected outcomes from an entrepreneurship educational curriculum.

After a clear review of the outcomes and the teaching mechanisms globally pursued for entrepreneurship courses and programs, the paper shifts the focus to the existing approaches of deliberating entrepreneurship education in Assam, a state in the North-eastern part of India. The study attempts to provide a critical outlook on the current course contents and methods employed for teaching entrepreneurship courses in three premier Universities of Assam viz., Gauhati University, Dibrugarh University and Tezpur University. For this purpose, an in-depth review of entrepreneurship syllabi of these three institutes has been carried out. Moreover, personal interviews have been conducted of the teachers who are engaged in imparting lessons on entrepreneurship courses in the aforesaid educational institutes in order to gain insight into their respective teaching approaches for the subject. The prime observation made in this regard is that the curricula are mostly based on texts and theories, without a pragmatic approach to it. They are basically engaged in what Linan (2007) regarded as 'Entrepreneurial Awareness Education', rather than creation of entrepreneurs. Identifying this lacuna in the existing teaching-learning practices, this paper, thus, puts forward a model which is suggestive of the idea that a well-designed and balanced entrepreneurship program must be a convergence between textual learning and off-the-classroom practice-based learning. The ultimate aim of proposing such a blended and heuristic approach to entrepreneurship education is generation of noticeable entrepreneurship behaviour among the participants of such programs.

Keywords

Teaching-learning methodologies, higher education, entrepreneurship pedagogy, entrepreneurship education, off-the-classroom, heuristic approach
Introduction

“Entrepreneurs are not born, but created by their experience as they grow and learn, being influenced by teachers, parents, mentors, and role models during their growth” (Volery et al., 2013) (p. 429). Today the researchers and academicians have been successful in establishing that the behaviour of entrepreneurship is not a result of innate abilities of an individual, rather is a learned phenomenon (Drucker, 1985). As examined by Chavadi and Sirothiya (2018), education enhances individuals’ receptiveness to entrepreneurship. In the same context, Linan (2007) is of the opinion that even though starting a new venture is an individual’s personal choice, but this personal decision is not enough to be an entrepreneur. The individual needs to be buttressed by facts and knowledge on entrepreneurship in order to be one. Further, the study by Hisrich (1990) stated that education acts as a strong base for entrepreneurial activity. The Human Capital Theory (Becker, 1975), a fundamental economic theory, extended a “microeconomic analysis to a wide range of human behaviour and suggested that knowledge and competencies can increase cognitive ability and lead to more effective activity” (Volery et al., 2013) (p. 430). Thus, education endows individuals with knowledge and proficiency, which enables them to be productive for self-sustenance.

Entrepreneurship Education (EE): Concept and purpose

According to Fayolle et al. (2006), entrepreneurship education refers to “any pedagogical [program] or process of education for entrepreneurial attitudes and skills” (p. 702). In the words of McIntyre and Roche (1999), EE includes “instruction in opportunity recognition, marshalling resources in the face of risk, and initiating a business venture” (pg. 33). In another definition by Walter et al. (2013), EE has been referred to the “scope of curricular lectures or courses that primarily aim at sensitizing and qualifying students for an entrepreneurial career” (p. 178). Jones & English (2004) are of the view that EE involves the process of enabling participants to recognize opportunities, develop self-esteem and equip them with knowledge and skills on venture creation. Instructions related to identification of opportunities, assembling of resources, tackling uncertainties and resources, steps in creating and sustaining a venture form part of EE. Therefore, it can be stated that the outcome of EE programs goes beyond the classroom (Borchers & Hee, 2011).

Entrepreneurship Education (EE) vs. Entrepreneurship Training (ET)

Valerio et al. (2014) in a report by the World Bank classifies Entrepreneurship Education and Training (EET) programs under two distinct but allied categories: education and training programs. According to the aforesaid report, EE programs target both secondary and higher education students but ET programs target a range of potential and practicing entrepreneurs who are not part of formal, degree-granting programs (Valerio et al., 2014). After an in-depth analysis of several entrepreneurship programs offered across the world, this report provides a comparative look on the outcomes of entrepreneurship education and entrepreneurship training programs based on four domains viz., mindsets, capabilities, status and performance. The distinctive revelation is that outcomes of EE programs around the world have been oriented towards developing and transforming mindsets of the participants which is only partially present in the outcomes of the ET programs. Thus, the EE programs around the world have displayed outcomes related to shift in socio-emotional skills and generating entrepreneurial awareness of the students at both secondary and higher education levels. On the contrary, the outcomes of ET programs do not account for changes in socio-emotional skills rather focussed on performance oriented outcomes.

After an in-depth analysis of several entrepreneurship programs offered across the world, Valerio et al. (2014) provides a comparative look on all of them which is evident from figure 1:
Figure 1: Comparative look into outcomes of Entrepreneurship Education and Entrepreneurship Training Programs
Source: Valerio et al. (2014), The World Bank, Washington, D.C.

The above figure lays down outcomes of entrepreneurship education and entrepreneurship training programs based on four domains viz., mindsets, capabilities, status and performance. The distinctive revelation from the figure is that outcomes of EE programs around the world have been oriented towards developing and transforming mindsets of the participants which is only partially present in the outcomes of the ET programs. Under the domain of mindsets, the two outcome components are socio-emotional skills and entrepreneurial awareness. Under socio-emotional skills, the parameters considered are: persistence, self-efficacy, need for achievement, pro-activity, creativity, optimism, locus of control, openness to ambiguity, opportunity recognition, self-confidence, leadership, communication and teamwork. The parameters under entrepreneurial awareness are: entrepreneurial values, attitudes, and norms, perception of entrepreneurship, willingness and intention to become entrepreneur (Valerio et al., 2014). As can be seen in figure 1, the EE programs around the world have displayed outcomes related to shift in socio-emotional skills and generating entrepreneurial awareness of the students at both secondary and higher education levels. Thus, it can be inferred from the above figure that one crucial outcome of EE programs worldwide has been to influence minds of the participants whereas the training programs aim at performance oriented outcomes. This argument is also supported by Setiawan (2014) who opines, “Entrepreneurship education is expected to develop entrepreneurial mindset and intention among students and to equip their knowledge and skills to be an entrepreneur” (p. 236). Clarity of this distinction is necessary so as to know what is to be expected out of EE.

Objectives of the study
The present study has been carried out taking into consideration the following objectives:
Being at the top of the pyramid, higher education system of a nation ought to be result-oriented. Correspondingly, entrepreneurship courses and programs in higher education need to have clear deliverables. In today’s date, several institutes across the globe and also in India are offering entrepreneurship education. However, there is a lack of uniformity in the objectives and outcomes of these courses and programs resulting in no apparent outcomes. In order to have an understanding of this close association between entrepreneurship education and higher education, the primary objective of this paper is-
1. To comprehend the nature of the objectives and outcomes appropriate for entrepreneurship programs/courses in the higher education system

In spite of the mushrooming growth in entrepreneurship courses and programs across India, the entrepreneurship scenario in the country is unsatisfactory. According to the Global Entrepreneurship Monitor (GEM) Report (2017-2018) India ranks 43rd out of the 52 participating global economies with regard to considering entrepreneurship as a good career choice. As such, while on one hand, entrepreneurship education is very much a part of higher education system of the country today, however, on the other hand, the outlook of the graduates towards entrepreneurship is not favourable. This necessitates a careful look into the curriculum of the entrepreneurship courses and programs being offered. In this backdrop, the second objective of this study is:

2. To examine the contents and pedagogy of entrepreneurship courses in select Universities of Assam

**Research method**

The present study is analytical in nature as it attempts to provide a theoretical insight into the concept of entrepreneurship education and its role in the higher education system. The first objective has been met by extensive literature reviews on entrepreneurship programs across the globe so as to comprehend the nature of the objectives and outcomes of these programs. A relationship between the objectives of higher education and those of entrepreneurship education has been established through inferences from the existing literatures. In order to fulfill objective no. 2, three premier Universities of India’s North-eastern state of Assam have been considered, viz., Gauhati University, Dibrugarh University and Tezpur University. Personal interviews with the concerned subject teachers and in-depth study of entrepreneurship syllabi of these select Universities were conducted so as to enquire about the contents and methods of imparting lessons of the said course.

**Higher Education and Entrepreneurship**

In conformity with the United Nations Sustainable Development Goal No. 4 of ‘Quality Education’, the higher educational institutes, today, are striving to offer world class courses to their enrollees. The objectives of higher education are very broad as they are concerned with edifying the students to be responsible human beings and up-skill them to understand the dynamics of the relationships among the varied elements in the society. The curricula of higher education are formulated with a focus on developing competencies and professional skills of students (Hodges et al., 2015).

The role of higher education is considered crucial in producing job generators. This has been discussed in the final report on ‘The World Declaration on Higher Education for the Twenty-First Century: Vision and Action and Framework for Priority Action for Change and Development in Higher Education’ by The World Conference on Higher Education in the year 1998. The Article 7 (d) of the report states that,

Developing entrepreneurial skills and initiative should become major concerns of higher education, in order to facilitate employability of graduates who will increasingly be called upon to be not only job seekers but also and above all to become job creators. Higher education institutions should give the opportunity to students to fully develop their own abilities with a sense of social responsibility, educating them to become full participants in a democratic society and promoters of changes that will foster equity and justice. (p. 6)
As such, Universities are expected to deliver solutions to the on-going social and economic distresses through well designed research works. As a driving force to entrepreneurship growth, it is a prerequisite for the Universities to implement entrepreneurship courses. In this context, Yildirim & Askun (2012) stressed upon role of Universities in creation of entrepreneurship climate and the need for teaching innovation and entrepreneurship skills in higher education besides theoretical learning. Thus, at the University level, teaching methods should be such that they promote active learning and allow students to explore their own skills and competencies (Hodges et al., 2015). In the similar context, Paltasingh (2012) opines that “the curricula need to be designed in such a way that at the end of the course the students should have combination of conceptual, textual as well as practical knowledge & information”. (p. 244)

**Entrepreneurship Pedagogy**

In the present times, the question of whether entrepreneurship can be taught is obsolete. Rather, there is a need to put more relevant question regarding entrepreneurial education as raised by Ronstadt (1987): ‘What should be taught?’ and ‘How should it be taught?’ (Kuratko, 2005).

It is pertinent to consider that there are scholars belonging to a different school of thought, who are of the view that formal education may deter an individual from being creative since they are trained to behave in a predictable manner. Luchins (1942) observes this as ‘einstellung’, “whereby learners who have earlier learned to solve a problem in a particular way will adopt a pattern that mechanizes their problem solving, inhibiting them from arriving at creative solutions” (Baumol et al., 2009) (p. 714). This means when a person is conditioned to behave in a certain manner, the ability to think differently diminishes. Thus, going by these arguments, it may raise a query on whether education and training programs formalize one’s way of thought and prevent one from being distinctive with their actions. There had been claims by Einstein and Piaget that growth of their intellectual capabilities had been hindered due to formal schooling (Feldman, 1999). In the similar lines, Collins and Moore (1970) observed that self-made entrepreneurs are better risk takers and more innovative than a person with professional degree in management. Taking these into consideration, the issues regarding the course contents to be taught and the manner of imparting lessons should be probed extensively. Contemplating over the limitations of formal classroom teachings on the ingeniousness of the prospective entrepreneurs, the pedagogy for EE needs to be designed accordingly. However, it is to be highlighted that even with a commendable proliferation of EE courses across various educational institutes and at various levels of formal education, there is dearth of standardized pedagogy for EE.

As reported by Rubin and Dierdorff (2009), it was found that the MBA curricula did not include the most critical managerial competencies. Similarly, in another study by Edelman et al. (2008), over 40 percent discrepancy was observed between the start-up activities mentioned in the entrepreneurship textbooks and the actual activities carried out by nascent entrepreneurs. Therefore, there is an urgent need to address this disparity in the entrepreneurship pedagogy.

Before attempting to design the entrepreneurship curricula, there needs to be a clear knowledge about the demarcation that exists between ‘education about entrepreneurship’ and ‘education for entrepreneurship’ (Laukkanen, 2000). Furthermore, the course objectives and outcomes must be framed as per its type since it may fall under any of the four categorises as defined by Linan (2007), viz., Entrepreneurial Awareness Education, Education for start-up, Continuing Education for Entrepreneurs, and Education for entrepreneurial dynamism.

There should be proper match between the pedagogy and the expectations from the course. Before discussing about ‘what to be taught’, the outcomes must be clear and unambiguous. Especially for Universities and other higher education institutes, providing only theoretical knowledge base should not be the outcome from the course. Duval-Couetil (2013) has referred to previous researchers in order to discuss the proposed outcomes of entrepreneurship education.
Table 1: Proposed Entrepreneurship Education Outcomes

<table>
<thead>
<tr>
<th>Authors</th>
<th>Proposed Entrepreneurship Education Outcomes</th>
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| (Falkang and Alberti 2000) | - Economic development  
| | Number of new firms  
| | Number of employees  
| | Innovation  
| | - Firm performance  
| | Financial performance  
| | Relation to other firms  
| | Innovation  
| | - Impacts to individual participants  
| | Self-employment  
| | Personal and career satisfaction  
| | Knowledge acquisition  
| | Skills acquisition  
| | Identification of individual potential  
| | Changed attitudes  
| (Fayolle, Gailly, and Lassas-Clerc 2006) | - Skills and knowledge—how well students have understood concepts  
| | - Student interest  
| | - Student awareness  
| | - Entrepreneurial intention  
| | - Attendance rates  
| | - Participation  
| (Pittaway et al. 2009) | - Entrepreneurial behaviors, skills, and attitudes  
| | - Empathy with the entrepreneurial life  
| | - Entrepreneurial values such as independence and ownership  
| | - Motivation toward an entrepreneurial career based on comparative benefits  
| | - Understanding the venture creation process  
| | - Developing generic entrepreneurship competencies how-to’s  
| | - Developing key business how-to’s  
| | - Networking and managing relationships with key stakeholders  
| (Vesper and Gartner 1997) | - Number of courses offered  
| | - Student enrollment  
| | - Financial commitment  
| | - Administrative support  
| | - Faculty qualifications  
| | - Publications by faculty  
| | - Impacts on the community  
| | - Venture creation by students and young grads  
| | - Resulting innovations  
| | - Stories of related alumni activities  
| (Wyckham, 1989) | - Dissemination of information  
| | - Inculcation of entrepreneurial values  
| | - Demand of students for entrepreneurial courses  
| | - Determination of a project’s feasibility  
| | - Preparation of a business plan for a new venture  
| | - Value of consulting performed by students  
| | - Correlation of entrepreneurial coursework and self-employment  
| | - Ventures launched  
| | - Growth and development of enterprises  

Source: Adapted from Duval-Couetil (2013), Journal of Engineering Education, 107(2)

Therefore, a look into table 1 provides clarity over the outcomes to be expected from an entrepreneurship course. It can be seen in the above table that apart from dissemination of information on entrepreneurship and its surrounding environment conditions, the other significant outcomes of EE programs have been generation of intention, innovativeness, development of entrepreneurial behaviour, skills and attitudes, motivating students for self-employment, venture creation and the like.
Referring to the objectives and outcomes of the course, the next step is to plan out the contents to be taught. After going through several literatures, Kuratko (2005) detailed out an extensive list of areas that have formed part of entrepreneurship education in the recent years. Some of these significant areas are Venture financing, Corporate entrepreneurship, Entrepreneurial strategies, Risks and trade-offs of an entrepreneurial career, Women and minority entrepreneurs, Ethics and entrepreneurship, Awareness of entrepreneur career options, Skill-building lessons, Idea protection, Ambiguity tolerance, Challenges involved in different stages of venture creation.

Souitaris et al. (2007) suggested the following components of a balanced entrepreneurship program:

- Concepts of business entities;
- Strategies of business planning;
- Interactive and networking opportunities; and
- Support from the institutions in terms of acquiring patents, conducting market-research, seed financing etc.

There can be modules designed that integrates the objectives of imparting business knowledge, developing intention and enhancing creativity through the same course (Linan, 2007). Entrepreneurship education can benefit from teaching techniques that incorporate entrepreneurial self-efficacy, entrepreneurial intentions and competencies. (Bayron, 2013)

Another effective technique is to hold interaction sessions with successful entrepreneurs so that when the students directly hear from those who actually made their businesses through hardships and challenges, they are inspired to follow their paths. A theory supporting this is the Social Cognitive Theory (SCT) (Bandura, 1986) which focuses on reinforcement and observation, as well as the cognitive processes of the subject. A brilliant approach to beget entrepreneurial mindset among the students was provided by Zupan et al. (2018) with the applicability of the ‘design thinking method’ in entrepreneurship classrooms. The step-by-step approach comprises of understanding and defining the problem, observation, ideation, prototyping and testing and implementation of the product/solution developed. It allows the students to look beyond the classroom boundaries and get a real field experience.

A similar approach is that of ‘experiential learning’, which is basically the process of learning while experiencing. Infact, it makes learning easy and more effective as compared to theory based learning. Lewis and Williams (1994) stated that, “experiential learning means learning from experience or learning by doing. Experiential education first immerses adult learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking” (p. 5). Application of tools like “student business start-ups, live cases, or simulations” (Edelman et al., 2008) (p. 57), help students to avail exposure to several issues of venture creation. Moreover, the experts of higher education regarded experiential learning as “antidote for traditional education” (Lewis and Williams, 1994) since traditional education encouraged theoretical deliberation of existing knowledge.

‘Networking’ is a vital area that the students need to be familiarized with. The EE, apart from delivering knowledge on the conceptual areas, must also disseminate skills to build networks pertinent for creation and sustenance of venture. Ronstadt (1987) propagated that an effective program must teach the students, ways to conduct themselves entrepreneurially and must also familiarize them with influential personalities in their line of business.
Entrepreneurship Education Scenario in Assam

During 1960s, when the concept of entrepreneurship development had just begun to gain acceptance throughout India, its North-East Region (NER) was not far behind. Out of all the states in the region, Assam was the first state to initiate the setting up of a district level agency called as Entrepreneurial Motivation Training Centre (EMTC) which in a way was an experiment to generate consciousness among the youths of the state about entrepreneurship. Established in the year 1993, the Indian Institute of Entrepreneurship (IIE) is the foremost institute for development and augmentation of entrepreneurship in the state of Assam as well as the whole of the North Eastern Region. Setting up of IIE in Guwahati has revolutionized the picture of entrepreneurship in the state and the region. With the various campaigns and awareness activities timely carried out by the institute, people of the region are now more receptive towards entrepreneurship as a career opportunity. Apart from being extensively engaged in training activities, the top officials of IIE also actively take part in advisory bodies of syllabus framing and revision of entrepreneurship courses in the region.

In the recent years across the state of Assam, the authorities have been attempting to orient the students towards entrepreneurship. At the intermediary level, the students of Commerce Stream enrolled in the schools affiliated to the Central Board of Secondary Education (CBSE) have Entrepreneurship as an optional subject in Class XII. The Class X students enrolled in the Board of Secondary Education, Assam come across the concept of entrepreneurship as a chapter in the elective subject ‘Commerce’. At the under graduate level, with the implementation of the Choice based Credit system (CBCS), there is uniformity in the syllabus of entrepreneurship as it is being offered in the Bachelor of Commerce (B.Com) 5th semester.

As in the previous section, ‘what should be taught’ has been discussed extensively; this section is an observation as to ‘what and how entrepreneurship is being taught’ in the study area. Further, in order to fulfil the second objective of the study, a review of the existing course contents of entrepreneurship of three premier Universities of Assam, viz., Gauhati University, Dibrugarh University and Tezpur University have been done in the following section. The former two are State Universities while the latter is a Central University. It was observed that the Master of Commerce (M.Com) and the Master of Business Administration (MBA) programs offer the entrepreneurship courses in these Universities.

Entrepreneurship- M.Com, Gauhati University

Gauhati University offers entrepreneurship as a core paper in the final semester of M.Com. This implies it is compulsory for all the students to write this paper. A thorough observation of the syllabus highlights the following:

**Course structure**

The entrepreneurship syllabus as offered for the M.Com students under Gauhati University offers an overview of the entire entrepreneurial process. The main chapters are hereunder:

- Importance of Entrepreneurship in the 21st Century
- Entrepreneurial process and Business Opportunities
- Concepts of Micro, Small & Medium Enterprises (MSME) in India
- Different modes of start-up finance
The syllabus puts forward a descriptive learning about entrepreneurs and their roadway to building up their ventures. A clear distinction has been made on the type of entrepreneurs and their nature and scope of operation in the very first unit. It also emphasizes on the significance of entrepreneurs in a developing economy like India. The chapter also mentions about the reports of Global Entrepreneurship Monitor. The second unit details out the issues related to idea generation, opportunity recognition and opportunity evaluation in different sectors. A study on Timmon's model has also been suggested in this unit. Moreover, various entrepreneurship support services and supporting organizations are also taught. The third unit is a broad coverage of issues and hurdles faced by MSMEs along with a look into the Micro, Small & Medium Enterprises Development (MSMED) Act, 2006. Moreover, issues of financial management, capitalization and capital structure planning have also been addressed by this unit. Additionally, the third unit covers the process of business plan preparation and the importance of creativity and innovation in the process of entrepreneurship. The last unit discusses the various modes to acquire finance for the business, like angel investors, venture capitalist etc. The fourth unit also throws a light on the assistances and subsidies offered by the Government of India towards growth and promotion of entrepreneurs.

Entrepreneurship- MBA, Gauhati University

Gauhati University also offers Entrepreneurship in its Master of Business Administration (MBA) program in the 2nd semester as an elective subject.

Course structure

A brief overview of the syllabus is as under:

- The entrepreneurial revolution
- Understanding the Entrepreneurial Perspective in individuals
- Environmental Assessment
- Assessment and Evaluation of Entrepreneurial Opportunities
- Strategic Planning for Ventures

The foremost unit provides an introduction to the concept and a picture of evolution of entrepreneurship till date. The second chapter emphasizes of the key concepts of entrepreneurial creativity and innovation. Since only the idea to entrepreneurship will not suffice, the third chapter is an attempt to draw attention towards some reality check in terms of feasibility study and preparation of business plan. The next chapter throws light upon issues involved in procurement of capital for venture creation as well as other threats and opportunities in the process taking into consideration the current support system available in the country. The course concludes by laying emphasis on concepts on family business and succession planning as a future outlook to a venture.

Another premier university under study is the Dibrugarh University. Likewise, lessons on entrepreneurship are being imparted in its M.Com and MBA courses. The following text provides an outline of the same.
Entrepreneurship- M.Com, Dibrugarh University

The M.Com program of the University offers entrepreneurship in the 2nd semester as a compulsory paper. The structure can be briefly stated as below:

Course structure

The entire syllabus can be summed up under the following heads:

- Introduction- definition and evolution of entrepreneurship
- Theories of entrepreneurship
- Opportunity analysis for a business idea
- Entrepreneurship Development programs (EDPs) in India
- Entrepreneurship and Economic Development

The course starts by introducing the students to the concept, nature, traits and behavioural pattern of an entrepreneur. The second unit is an attempt to impart lessons on the various conceptual models and theories of entrepreneurship. Thirdly, class sessions on opportunity analysis, financial analysis and marketing analysis are proposed by the syllabus for building up an effective business plan. Also, meaning and importance of micro finance institutions are to be discussed. In the next chapter, the role and relevance of EDPs in India along with their critical evaluation is to be looked upon. Lastly, the present status of economic development in NER India as well as the role of entrepreneurs in this regard is highlighted.

Entrepreneurship- MBA, Dibrugarh University

The MBA program in Dibrugarh University offers Entrepreneurship in the 2nd semester as a core subject. The course is designed with the aim of acquainting the students with the entrepreneurial perspectives and also to encourage them to be future entrepreneurs.

Course structure

The syllabus is categorized into the following:

- Entrepreneurial perspective
- Opportunity analysis
- Institutions assisting entrepreneurs
- Entrepreneurship development in North East India
- Innovation, creativity and entrepreneurship
- Preparing a business plan
- Small scale industry
- Case study

The syllabus, as such, attempts to offer a broad coverage on the various aspects and dimensions of entrepreneurship. Chapter 2 and 5 consist of lessons on idea generation, role of innovation and creativity as the basis of entrepreneurship development. Chapter 6 is an entire unit for formulating and preparing a detailed business plan. The syllabus, further, has chapters on the institutional support offered to the indigenous entrepreneurs of the state and the country.
Entrepreneurship- MBA, Tezpur University

A leading central University in the state is the Tezpur University. The following section provides an overview on the course contents of Entrepreneurship Development which is offered in the MBA program of the University as a core subject in the 4th semester.

Course Structure

The chapters are under the following heads:

- Fundamentals of Entrepreneurship
- Understanding Small Business
- Setting up a Business unit
- Continuing successful business

In the syllabus, the first unit begins with introduction to the concept of an entrepreneur and the factors affecting entrepreneurial environment. The second section of the first chapter throws light into achievement motivation, Thematic Apperception Test, stress management and innovation. The third section has discussions on the various support institutions and the government policies for growth of entrepreneurs in India. The contents of the second unit include details about small businesses like MSMEs, cottage industries, village industries. Moreover, the chapter also covers other aspects of setting up a small business like special economic zones, look east policy, viability of small businesses in NER and the various ministries of the Government of India assisting small businesses. The third unit provides a procedural guide for entry into entrepreneurship. Detailed discussions on the steps involved in setting up a business and value added decision making in venture creation have been mentioned in this unit. The last unit is about project report formulation, project appraisal and post project monitoring procedure.

Results and discussions

After enquiring into the methods used for imparting lessons on entrepreneurship by the subject teachers in each of these institutes for the two programs (M.Com and MBA), it was observed that the course is mostly taught in a classroom setting. Even though entrepreneurship is a practice, but the practical approach to teaching this course is absent. The curricula are mostly based on texts and theories on the topic, without a pragmatic approach to it. The programs involve internships and project works, however, the entrepreneurship paper is taught theoretically. Another crucial observation has been the absence of entrepreneurship programs (they offer only a course within M.Com and MBA programs) in any of these three institutes which are considered among the top institutes of the state of Assam as well as the entire North-East India. On the brighter side, for all of these programs, classroom discussions on recent trends and case studies on successful national and local entrepreneurs are encouraged. This assists the students in deeper understanding of the subject.

A matter of fact is also that there is less clarity in the course objectives and outcomes of Entrepreneurship in these aforesaid institutes. Even though the entrepreneurship syllabi of Gauhati University mentions ‘ability to initiate, manage and carry out small business enterprises’ as its course outcome, however, the graduating students have not quite often displayed entrepreneurial behaviour. It can be, thus, inferred that the present EE imparted in these institutes, fits into what Linan (2007) regarded as ‘Entrepreneurial Awareness Education’ since the existing pedagogy do not aim at the students’ make over into entrepreneurs, rather enlightens them on the issues and facts of entrepreneurship. This very much contradicts the objectives of higher education system. As the Universities all across the world strive to be sources of creating entrepreneurs, the pedagogy of these institutes under study needs to be enriched with other aspects of entrepreneurship so as to sensitize students to the various facets of venture creation.
Solely delivering classroom lessons without the aim to create and nurture self employment intentions among the participants is strictly not what entrepreneurship education stands for. In other words, the fruitfulness of entrepreneurship courses should be measured in terms of the participants being aware of self employment as a viable career option after such courses. Based on the aforesaid discussion on the components of entrepreneurship pedagogy, the following teaching-learning approach has been put forward as a suggestive measure (as shown in Figure 2). The model suggests that a well designed and balanced entrepreneurship program must be a convergence between textual learning and off-the-classroom practice based learning. There needs to be a heuristic approach to creative problem solving by the students in the entrepreneurship classes.

Figure 2: Comprehensive Approach to Entrepreneurship Pedagogy
Source: Suggested by the researcher

This suggested model attempts to work upon the lacunae in the existing entrepreneurship pedagogy in the educational institutes of Assam. Since it was observed that across the top institutes of the state, the entrepreneurship course is being imparted in the form of classroom lectures. The participants heavily rely upon textual references and notes to fulfil the requirement of the syllabus. However, it is a well known fact that entrepreneurship as a subject has implications even after the course and therefore, the teaching methodology must encompass a combination of both textual as well as empirical techniques. As can be seen in the above figure, the comprehensive approach to entrepreneurship pedagogy is an integration of theories, concepts, explanatory texts on one hand and off-the-classroom tools on the other. Textual learning is important for the students to acquire a first-hand picture of what the subject matter is all about. A simultaneous application of practical and applied learning must also form part of the course impartation process. The techniques suggested in the model are:

a. **Experiential learning**: One of the best techniques of learning is while have real-life experience of the matter. For example, when the students are taught about business plans, allowing them to develop their own business plans will provide them a better learning on the topic.

b. **Case studies**: Factual cases on venture creation, challenges thereon and strategic decision making illustrate a true picture among the students. Cases studies are a means of storytelling about situations encountered by entrepreneurs in their day-to-day business operations.

c. **Networking and Negotiation skills**: When the participants of the entrepreneurship courses set their feet into the actual world of venture creation, they definitely realize that the process is laden with complexities. Only when they have acquaintances in the field, the difficulty level reduces. It is a desirable step on the part of the institutes offering the course that the prospective entrepreneurs are made to meet and network with significant and experienced personalities in the field. Moreover, to be able to network, the students need to well-equipped with communication and negotiation skills. This set of technique act as stepping stone for the prospects.

d. **Role playing**: While the students get to know about entrepreneurs and the challenges they face, they can be asked to fit themselves into the shoes of the entrepreneurs and assume their role for a certain situation. While placing themselves to play the role of the entrepreneur, they have to take decisions and provide justifications for the same. This enables the students to analyse a situation from the entrepreneur’s view point.
e. **Interactive sessions with successful entrepreneurs:** When the participants hear from successful entrepreneurs themselves on a one-on-one basis, the experience inspires them to follow the same path. Moreover, interactions also allow them to get any myths in their minds busted. Candid conversations with self-made entrepreneurs act as impactful source of motivation for the prospects.

f. **Simulation:** In order to get the students tested before starting-up, they can be put into situations which are exact replica of the real field experiences. The actual situation and the set-up can be simulated that test the waters prior to beginning with the entrepreneurship process.

g. **Business plan games:** Competitions can be initiated among the students wherein they need to demonstrate their business ideas and present their business plans. The best plans can be sorted out and the students can be mentored accordingly.

h. **Field trips:** Short trips to workstations, manufacturing units and official set-ups of local entrepreneurs provide students a visual guide to setting up their ventures in the future.

Such a course structure of entrepreneurship is expected to stimulate entrepreneurial intention and equip the students with the skills necessary for venture creation.

**Conclusion**

A critical examination of the present teaching method and contents of Entrepreneurship course of select Universities of Assam revealed that lessons for this subject are imparted mostly in a classroom setting. With some emphasis on case study deliberations, the pedagogy is mostly theory oriented. It has been observed that the educational institutes offering entrepreneurship courses rarely exhibit ‘creation of entrepreneurs’ as their course outcomes. As such, for a course like entrepreneurship from which concrete outcomes are desired, an appropriate blend of classroom and off-the-classroom teaching-learning methodology is crucial. A quick glance into the present economic condition of India will necessitate us to conclude that there is an immediate need to educate and train young minds in entrepreneurship so that they not only start-up but also innovate and provide the market with newer and better results. Keeping this in mind, the policy makers and educationalists need to focus upon framing and designing the curriculum of entrepreneurship courses and programs that enable students to imbibe certain skills and abilities like innovative problem solving, creative thinking, negotiation and networking along with the basic marketing and business lessons. The matter on the relevance of the present entrepreneurship education curricula and pedagogy across the state of Assam needs to be attended to. In a nutshell, timely revisions and amendments in the education system will pave the way for a brighter future for the generations to come.
References:


From ascriptive to descriptive: A comparative study of pedagogical Indicators in India

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Abstract
Since time immemorial, quality of education as an indicator, especially in India, has been enumerated by commensurable variables (ascriptive) like literacy rates, enrollment ratios, retention rates, drop-out rates, gender parity ratios, pupil-teacher ratio, classroom-teacher ratio, attendance, vacancies, number and types of schools, students and teachers, mean and expected years of schooling, allocation of funds, availability of basic amenities etc. Even today, many of the surveys that are conducted by both governmental and non-governmental organizations, miss out on descriptive indicators of quality of education, which directly deal with the teaching and learning processes and the factors determining them. In pursuit of the same challenging task, this paper has borrowed as well as formulated some descriptive pedagogical indicators from four nationally implemented policies and programs, and tried to gauge the responses of both teachers and pupils in two states of India, through carefully designed field surveys and questionnaires. By doing so, it tries to interlink the macro (nation-level initiatives or programs and their accompanying objectives) with the micro (interactions between the pupil and the educator, among educators and between the teachers and administration), in pursuit of the quest i.e. trying to ascertain what is presently happening at the ground, what are its implications and what can be learnt from it in terms of future approaches and policy reformations?

Keywords
Pedagogy, Teaching, Quality of Education, Ascriptive, Descriptive
Introduction

For a change to stick it must find a place in teachers’ thinking, in their belief systems, and in their habitual ways of acting and interacting within the classroom or grow out of their...[own]...thinking
(Bullough and Baughman, 1997)

This quotation, brings to light, a variable which has insurmountable relevance with reference to schooling, but has remained underexplored in the past, especially in the realm of empirical research i.e. pedagogy. The quote talks about how a system should prevent itself from undermining the strong link between educational reforms and educators, who are, in reality, the grassroot level implementors of public policies, and how genuine transition in education can occur through their resolve.

Derived from a Greek work paidagogos, meaning leader of the child, pedagogy was initially understood in terms of the acts of pedagogues, who were qualified guardians, bestowed with the task of teaching and training the progenies of their masters, by taking them under their tutelage at an early age (Smith, 2012). In contemporary parlance, the term has been methodologically conceptualized by many scholars, one of them being Robin Alexander. In his breakthrough work on comparative pedagogy, based on the field work conducted by him between the years 1994 to 1998, in England, Russia, France, USA and India, Alexander defined pedagogy as “the performance of teaching together with the theories, beliefs, policies and controversies that inform and shape it” (Alexander, 2000). For him, teaching was not just an act, but was also a discourse in itself and had to be studied along with all its affiliated dimensions. In one of his works, Still no pedagogy? Principle, pragmatism and compliance in primary education (2004), Alexander marked the transition from teaching to pedagogy through three dimensions. In the first dimension, teaching was perceived as an activity associated with students, their learning and understanding, and the planning and execution of teaching practices, done by the teacher, in relation to the curriculum. The second dimension, legitimized teaching by placing it within a particular context i.e. a school system and the policies of the respective regulating authority of the state. The last dimension depicted how teaching was value laden and had a purpose, which was determined by locating it in the time and space it was situated in i.e. culture.

A plethora of researches being conducted in the domain of teacher thinking, beliefs and practices, either in India or foreign nations, have relied upon this very definition of pedagogy. While attempting to justify its selection of Bernstein’s (1975) and Alexander’s (2000, 2009) definition of pedagogy, for determining which pedagogic practices were most effective in ensuring student learning, the Department of International Development (DfID), of United Kingdom, mentioned that this conceptualization was incorporative of the macro i.e. the educational policies of the state, as well as the micro i.e. the interaction and exchanges between the teacher and the student, and was able to effectively collaborate the three fields of curriculum, teaching and assessment. Thus, the definition was an amalgamation of three domains i.e. teacher doing, teacher thinking and the impact of the two on the learners (Westbrook et al., 2013).

This research article will depict how the researcher adopted the aforementioned definition of pedagogy, and used it as the basis for extracting pedagogical indicators from four national level educational policies in India. This plan assisted her in determining how the teachers and students in Uttar Pradesh and Himachal Pradesh performed, as well as responded to, the variables henceforth selected. But before delving into this realm directly, this paper will follow a systematic chronology where section (i) will discuss the historical trajectory of the debates on quality of education, its obsession with ‘input-output’ model, and how the discourse gradually shifted to ‘processes’, of which pedagogy was an indelible part. This section will therefore highlight the primary research problem, which in turn will be accompanied by the research questions posed by the study; section (ii) will discuss the difference between ascriptive and descriptive indicators of quality of education and the necessity of shifting more towards the latter; section (iii) will talk about the research methodology followed for conducting a comparative study of these descriptive pedagogical indicators in the schools of Uttar Pradesh and Himachal Pradesh; section (iv) will deal with the findings of the research; and the last section (v) will focus on the accruing suggestion and recommendations. The implications of the study along with the scope for future research in the area, will be a part and parcel of the conclusion.
While doing an intensive study of the quality indicators selected in the Education for All initiatives, Global monitoring agencies were preoccupied with “input and output” and not the “process” in totality (Alexander, 2015). By processes he meant the teaching and learning activities taking place within the classroom and the factors governing them. He claimed that even when these variables were considered in a few reports, they were still devoid of objective criteria of measurement and were mistaken to be adequate measures rather than mere indicators of quality of education.
Synonymous to Alexander’s claim about the tools used for indicating quality of education suffering from an “empirical myopia”, Kumar and Sarangapani mentioned about how there was an obsession with the input-output model or “black-box” model of education, which only circled around the infrastructural amenities, provisioning, staff availability and outcomes in terms of performance level of students. All these scholars, tried to demystify the façade associated with achievements of access related targets and how this was in turn robbing the education system of making some serious incremental transformations and policy-related developments. Sarangapani argued that a wider and inclusive concept of quality of schooling would entail five assessable dimensions: aims of education; provisioning or availability of infrastructural resources and curriculum; standards and assessment; pedagogy; and accountability. The all-encompassing nature of these variables surely expands the purview of assessing quality of education, but this paper will try to focus primarily on the role played by pedagogy in determining quality of education.

All these discussions ultimately lead us to the research question for this paper i.e. what role does pedagogy play as a variable in determining quality of education in Himachal Pradesh and Uttar Pradesh? The answer to this question can be ascertained by focusing on an interrelated subsidiary query i.e. what are the advisable pedagogical parameters (descriptive features) mentioned in SSA, RTE and NCF and NCFTE and what is the status of teaching and learning in the two states, with reference to them? In a nutshell, the paper proposes to study the interaction between micro (engagements within the classroom and among pupils and teachers through the perspectives and answers given by them) and macro (with reference to the denominators set by national educational policies) level factors, influencing learning and teaching at the elementary level, in the two states. It will attempt to study the beliefs and practices of elementary school teachers, through the responses of the teachers themselves, and try to analyse them further with the help of the views shared by their respective pupils.

From Ascriptive to Descriptive Attributes: An Imperative Shift

In 1936, an anthropologist by the name of Ralph Linton, in The Study of Man: An Introduction, formulated two concepts for determining the positioning of individuals or groups within the social structure and these were “ascribed status” and “achieved status”. The former denoted the status accruing or “assigned to individuals without reference to their innate differences or abilities.” It included those characteristics which were attained by birth or lineage and the individual had negligible control over them e.g. race, gender, ethnicity, caste etc. Achieved status, on the other hand, was determined by the efforts or performances of the individual (Foladare, 1969).

Methodologically borrowing from the above analogy, two similar yet slightly distinct categories can be created for understanding the indicators formulated by governmental institutions or non-governmental organizations, to determine quality of education. These two categories are “ascriptive” and “descriptive”. Ascriptive attributes incorporate those aspects which are judged on grounds of face value and can easily be reduced to numerical data. These are nominal in value and content because they capitalize on those indicators which are more inclined towards inputs or outputs, rather than focusing on the aspects of teaching-learning, e.g. number of permanent or para-teachers/government or private teachers, attendance, vacancies, PTR, trained or untrained teachers etc. Descriptive attributes, on the other hand, are those which delve deeper into the education system and focus on holistic concerns pertaining to pedagogy and learning, like teaching methods and strategies opted, satisfaction levels with reference to remunerations, curriculum or their jobs, teacher attrition, resolution of conflicts, views on teacher training, the relationship between the students, fellow teachers as well as parents and the equation between the teachers and administration. Unlike ascriptive attributes, the descriptive features are more detailed and illustrative, process-oriented, and are well equipped to act as less-superficial indicators of quality of education. They take the attention away from mere achievement levels of students or availability of teaching-learning materials, as done by numerous state-wide surveys and institutions in the past, to yardsticks related to teachers and their pedagogy. Thus, for a more in-depth analysis, interception of descriptive attributes is inevitable, as like the achieved status of Linton, these are also based on the performance and actual practices of the teachers. Nonetheless, this paper in no way suggests that researches done on ascriptive attributes are futile. Rather it puts forward the argument that there needs to be a synthesis between the two attributes of ascriptive and descriptive for analysing the functioning of a current educational program and formulating a holistic policy towards effective and sustainable education.
In order to select descriptive indicators related to pedagogy, from the four national educational policies, i.e. Sarva Shiksha Abhiyan (2002), The Right of Children to Free and Compulsory Education (2009), the National Curriculum Framework (2005), and the National Curriculum Framework for Teacher Education (2009), and incorporate them in questionnaires as well, the researcher decided to take help of the list of four tests suggested by Harlen and Alexander. The descriptive indicators that were finally selected for this study are showcased in the figure given below:

![Descriptive Indicators of Pedagogy Selected from National Level Policies and Programs](source)

**Figure 1: Descriptive Indicators of Pedagogy Selected from National Level Policies and Programs**

*Source: (MHRD, 2004; Ministry of Law and Justice, 2009; Mondal, Saha, & Baidya, 2015; NCERT, 2005)*
Research Methodology

The nature of research was exploratory i.e. research whose primary objective is to find out more about an issue or phenomenon which has been little understood or examined in the past. The study adopted a mixed methods approach as the type of research questions posed asked for both deductive and inductive strategies. Some close-ended questions dealt directly with pedagogical indicators, how the teachers responded and performed in reference to them (quantitative approach), while some other questions demanded a more open-ended research, where the focus was more on exploring and trying to understand the meanings that people ascribe to a phenomenon or issue (qualitative approach).

Furthermore, both primary and secondary data were utilized and collected during the course of the study. Data was collected from 24 schools each in Uttar Pradesh and Himachal Pradesh (8 schools per district from the three districts selected in each state i.e. In Uttar Pradesh - Lucknow, Sonebhadra and Saharanpur; In Himachal Pradesh – Shimla, Hamirpur and Kullu). Since the research adopted a survey method, along with focused-group-discussions with the participants, the number of sample was decided with the help of a probability sampling technique i.e. multistage cluster sampling. The state was divided into three equal clusters on the basis of the positioning of districts on the map i.e. left, right and centre, and one district was eventually selected from each cluster, making sure that the capital was one among them. From these districts, one urban area and rural village was selected from the primary tehsil.

The population size for teachers and students in Uttar Pradesh was determined on the basis of the State Report Cards of 2014-15 (NUEPA, 2015). Accordingly, the sample size was determined by keeping the confidence level at 90 percent, margin of error at 6 percent, z-score at 1.645 and population proportion at 50 per cent. The final sample size was: 190 for both teachers and students alike. In order to do justice to representing these statistical numbers, the researcher selected classes 5 and 8 from each school, as elementary education was the primary concern of the study, and from amongst these two classes, 5 students were randomly selected from classes V and VIII each (10 students per school). Two teachers were selected from classes V and VIII each, one from language (Hindi or English) and the other from social science subject. Thus, overall, 96 teachers and 240 students (per state) were surveyed over a period of approximately three and a half months (November-December, 2019 and February-March, 2020). The semi-structured questionnaires, that were prepared for the two groups, were comprised of:

- Teachers’ Questionnaire: 48 questions on pedagogy
- Students’ Questionnaire: 26 questions on teachers, their behavioural and teaching patterns and students’ views on learning

The uniqueness of this research study was based on the factor that the entire research methodology was driven by three principles. Firstly, a direct link between ‘quality education’ parameters mentioned in nation-level polices, and the ‘quality of education’ indicators, was created by unearthing descriptive pedagogical indicators from within them and preparing questions to ascertain them; Secondly, rather than measuring the learning outcomes of the students, their views and opinions were incorporated, in order to check the authenticity of the answers provided by their educators and to also include pupils’ perspectives in general. By doing so, the research was able to tap all the elements of pedagogy i.e. teacher thinking (through the answers shared by teachers), teacher doing (through the answers shared by both teachers and students) and its impact on learners (through the answers shared by learners); Lastly, comparative pedagogy was adopted as it would help in collecting data which was richer and much more beneficial and insightful in terms of policy recommendations. Such data would be fruitful in providing a holistic understanding of the issues at hand and would even be able to help the researcher in deciphering the reasons for the various systemic loopholes and the reasons behind - why and how one state is performing better than the other? To sum up, the overall objective was to conduct an inter-state comparison of pedagogical indicators of quality of education in the two states, analyse their repercussions on the students’ overall development and understanding, and to collect information about the views of students and teachers, on teaching related matters and pedagogical skills and strategies, and their impact.
Research Findings

Desirable and Undesirable Qualities in Teachers

Based on the soft data shared by the respondents, regarding the attributes of a teacher, it can be gathered that the desirable attributes were more or less alike for the two groups, in the two states. While for the teachers, the five popular responses, as depicted in Figure no. 2, were content knowledge or command over the subject, dedication of the teacher, understanding his/her students, punctuality and patience, for the students they were good teaching and explanation skills, politeness, understanding by nature, caring and organization of engaging activities during the course of the lesson. This parity in responses could also be seen, to some extent, in undesirable qualities of a teacher, where being short tempered was matched by anger, scolding and strictness among the answers given by students. Majority students in UP mentioned being beaten or hit by the teacher as one of the prominent bad qualities and this was against the standardized norms of the government.

When the students were asked to identify their teachers from one of the three options given, they responded in the following proportion: -

- Aggressive: 5% in UP and 6.3% in HP
- Strict yet Understanding: 62.1% in UP and 50.4% in HP
- Friendly: 32.9% in UP and 43.3% in HP

As depicted, the students of both Uttar Pradesh and Himachal Pradesh, rated strict yet understanding as their foremost choice in characterizing their educator, but the propensity of identifying one’s teacher as friendly was higher in Himachal Pradesh as compared to Uttar Pradesh.
b). Teaching Methods and Aids

The first question posed to the respondents, regarding teaching methods, was the number of methods they were aware of, as represented in Figure no. 3 (a). While the majority in Uttar Pradesh had knowledge about 0-3 methods, in Himachal Pradesh, the maximum proportion of respondents fell in the category of 4-6 methods. Some of the educators in elementary education, belonging to Uttar Pradesh, were not aware of any method (7.2 %).

When asked about which teaching strategy they preferred the most, majority of the responses were positively disposed towards Ability Based Learning Methods (53.1% in HP and 46% in UP), where students were encouraged to work upon developing a skill, they had aptitude for or inclination towards; to participate in either individual or group-based activities, designed by the teacher; and to fearlessly ask as many questions they felt like asking and clearing their doubts. The other popular responses were usage of audio-visual aids and group-based discussion methods. As is clearly visible from the statistics given in Figure no. 3 (b), 5% of teachers, exclusively in Uttar Pradesh, believed in an authoritative style of teaching, and 7.3% respondents in Himachal Pradesh, specifically, were unwilling to state any one strategy to be the best, as they believed that different subjects required different strategies. 10.4% of HP teachers mentioned that daily life correlations, by discussing contemporary social issues or giving examples from the social milieu that the children were coming from, were representative of a well-structured teaching strategy.

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Figure 3 (b): Best Teaching Method

In contrast to the findings shared before, majority teachers in Uttar Pradesh regarded rote learning method to be beneficial for kids, with the primary reason behind it being: faster learning technique (64.2%). Teachers of Himachal Pradesh, believed rote learning to be non-beneficial (80.2%), and they cited fast forgetting of the information formerly learnt (64.9%), followed by lack of conceptual clarity (32.5%), as the chief reasons. Refer to Figure no. 3 (c) for further details.
Another essential dimension of teaching method that was included in the questionnaires was inquiring about the intended responses of teachers in certain student-related scenarios like cheating, eating in class, using foul language, being disrespectful, beating classmates, being late and bringing mobile phones. The open-ended nature of this query resulted in a diverse set of responses, which were methodologically assigned into respective categories: warning, teaching values, punishing, informing parents or principal, trying to know the reason and encouraging behavioural changes. What can be duly concluded from the responses of educators, is that, in Himachal Pradesh, the teachers proactively opted for milder actions like trying to know the reason, encouraging behavioural changes or educating pupils about values, warning, and counselling, as and when deemed fit, as compared to teachers in Uttar Pradesh, who relied more on warning and punishment tactics, besides encouraging behavioural modifications. By doing so, the former group naturally aligned itself with the salient pedagogical objectives and criterion set by national educational initiatives.

Around 90 percent students in Uttar Pradesh and 74.2 percent in Himachal Pradesh, admitted to having faced some form of punishment. The choice of punishment further revealed that, teachers in Uttar Pradesh preferred corporal punishment i.e. beating / hitting with hands or sticks (48.2% in UP and 10.4 % in HP), to other tactics, while the educators in Himachal Pradesh, depended more on verbal communication methods like warning and scolding, followed by making pupils stand with arms raised or hold their ears. Refer to Figure no. 3 (d) for related information on the subject.
Lastly, the teachers were asked to highlight the problematic areas in the teaching methods adopted by their colleagues. While Uttar Pradesh's teachers acknowledged *lack of proper knowledge of the subject* and *short tempered or rude behaviour* as the most common flaws, followed wastage of time in gossiping or mobile phones (9.2%), *boring lectures or paucity of engaging activities* (7.9%), *lack of discipline in class or noisy classroom* (6.6%) and *discriminatory behaviour* (6.1%), teachers in Himachal Pradesh, believed *being short tempered or rude behaviour* (15%) to be the most disturbing trait, followed by *Stagnant Approach / Not Changing One's Pattern of Teaching* (14.2%). If the issue of *stagnant approach* is clubbed with its affiliated concern of *less use of technology by educators* (4.5% in HP and 0% in UP) and the data given in Table no. 3 (c) about rote memorization, it signifies how the educators in Himachal Pradesh were relatively vigilant in acknowledging the prevalence and problem of traditional teaching methods e.g. “lecture method” or “rote memorization”. Refer to Table no. 3 (e) for an overview of the findings.
**Noticeable Flaws in the Teaching Mechanism of Colleagues**

<table>
<thead>
<tr>
<th>Flaw</th>
<th>Himachal Pradesh</th>
<th>Uttarakhand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wastage of Time in Gossiping and Mobile Phones</td>
<td>2.20%</td>
<td>9.20%</td>
</tr>
<tr>
<td>Unpunctual</td>
<td>2.50%</td>
<td>9%</td>
</tr>
<tr>
<td>Untidy Office</td>
<td>1.20%</td>
<td>6.10%</td>
</tr>
<tr>
<td>Unplanned</td>
<td>4.50%</td>
<td>5.90%</td>
</tr>
<tr>
<td>Overfriendly Behaviour</td>
<td>0%</td>
<td>5.90%</td>
</tr>
<tr>
<td>Stagnant Approach / Not Changing One's Pattern of Teaching</td>
<td>3.10%</td>
<td>14.20%</td>
</tr>
<tr>
<td>Short Tempered or Rude Behaviour</td>
<td>15%</td>
<td>19.10%</td>
</tr>
<tr>
<td>Not Using TLM Properly</td>
<td>1.50%</td>
<td>5.30%</td>
</tr>
<tr>
<td>Not Giving Extra Time to Weak Pupils</td>
<td>1.50%</td>
<td>4.90%</td>
</tr>
<tr>
<td>Less Use of Technology</td>
<td>0%</td>
<td>4.90%</td>
</tr>
<tr>
<td>Lack of Proper Knowledge of Subject</td>
<td>5.70%</td>
<td>19.10%</td>
</tr>
<tr>
<td>Lack of Discipline in Class / Noisy Classroom</td>
<td>4.50%</td>
<td>6.60%</td>
</tr>
<tr>
<td>Irregular Attendance / Too Many Leaves</td>
<td>0.70%</td>
<td>3.70%</td>
</tr>
<tr>
<td>Gives too much Punishment</td>
<td>2.50%</td>
<td>5.20%</td>
</tr>
<tr>
<td>Does Personal Chores in Class</td>
<td>2.90%</td>
<td>4.90%</td>
</tr>
<tr>
<td>Discriminatory Behaviour</td>
<td>6.10%</td>
<td>9.80%</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>5.90%</td>
<td></td>
</tr>
<tr>
<td>Boring Lectures / No Engaging Activities</td>
<td>6%</td>
<td>7.90%</td>
</tr>
</tbody>
</table>

*No. of Teachers who did not respond to this question: - 51 in Uttar Pradesh and 38 in Himachal Pradesh*

The teachers were also posed questions about the availability and usage of teaching aids at their disposal. The first question was about how they would characterize the resources available to them, and their responses were:
- Efficient and Adequate: 38.5 % in UP and 59.4% in HP
- Feasible / Could Be Better: 47 % in UP and 40.6% in HP
- Inefficient and Inadequate: 14.5 % in UP and 0% in HP
The respondents who mentioned that the resources were inadequate and inefficient or could have been better, were further asked to justify their answers. As is vividly depicted in the bar graph below, lack of availability of the resources, be it teaching-learning materials, classrooms and toilets or audio-visual aids, was the prominent area of concern, followed by no upgradation. One exclusive scarcity which was highlighted by teachers of Himachal Pradesh, was lack of trained teachers.

![Figure 3 (f): Reasons for Considering Resources as Inadequate or Inefficient](image)

<table>
<thead>
<tr>
<th>Issues Faced</th>
<th>Himachal Pradesh</th>
<th>Uttar Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Upgradation</td>
<td>16%</td>
<td>32%</td>
</tr>
<tr>
<td>Lack of TLM</td>
<td>24.00%</td>
<td></td>
</tr>
<tr>
<td>Lack of Trained Teachers</td>
<td>16%</td>
<td>0%</td>
</tr>
<tr>
<td>Lack of Maintenance</td>
<td>2%</td>
<td>6%</td>
</tr>
<tr>
<td>Lack of Funds or Grants</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Lack of Electricity</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>Lack of Classrooms and Toilets</td>
<td>12.00%</td>
<td>18%</td>
</tr>
<tr>
<td>Lack of Audio-Visual Aids</td>
<td>16%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Classroom Environment

The teachers were asked to address a specific query about the features of a healthy classroom environment, as shown in Figure no. 4 (a). On the tabulation of the responses, it can be seen that, for both the states, active participation by students gained utmost support, followed by good or cordial relationship between teachers and students, organization of engaging activities and joyful or stress-free environment, in Himachal Pradesh, and adequate provisioning or availability of TLM, skilled teachers and a disciplined classroom, in Uttar Pradesh, respectively.
The students were also posed certain questions about classroom environment and teaching and learning per se. While both the states witnessed approximately equal percentage of responses with reference to punctuality of teachers, Uttar Pradesh ranked lower than Himachal Pradesh when it came to students not being scared of their teachers and teachers not being strict. Besides this, the percentage of students being hesitant in asking questions or giving answers in class was lesser in Himachal Pradesh than Uttar Pradesh. Lastly, when it came to the larger question of whether students were enjoying learning or not, Himachal Pradesh ranked higher in the ‘yes’ category of answers. Figure no. 4 (b) provides all these figures in a simplified format.
In collaboration to whether the students enjoyed learning or not, the pupils were asked to specify the primary reason for disliking studies. Pupils from Uttar Pradesh mentioned, *unclarity or not understanding what is being taught in the classroom* as their popular choice, followed by *rote learning or memorization*, and *teacher does not teach well*. Apart from these, *being hit by the teacher* was also mentioned as a factor and its intensity was relatively higher in Uttar Pradesh. The students in Himachal Pradesh, on the other hand, revealed that *too much homework*, *unclarity or not being able to understand what is being disseminated within the classroom* and *rote memorization* were the main factors, and the propensity of the latter two was lower than what was experienced in Uttar Pradesh. Figure No. 4 (c) provides an overview of students' responses.
Participation in Non-Teaching Activities

The researcher designed a specific dedicated question which asked the teacher respondents to rate their level of participation in non-curricular activities, among the four options given. From the responses henceforth gathered, it was evident that teachers, from both the states, mentioned involvement in Other Miscellaneous Extra-Curricular Activities (Debates, Meetings, Festivals, Sports, Annual Events, Competitions, Fairs etc.) as the most potent factor. In areas of administrative work and participation in Panchayats / Community Related Work (Health camps, Mid-Day Meals, Family Planning Campaigns, Pensions etc), teachers in Uttar Pradesh rated a slightly higher level of engagement, as compared to Himachal Pradesh.

Besides miscellaneous extra-curricular activities, the one area where teachers of Himachal Pradesh experienced greater level of involvement, was training and invigilation related work. Though any form of involvement by teachers in any activity, besides classroom teaching, would hamper their pedagogic responsibilities in some form, their participation in training sessions and invigilation works, somehow, still seemed like an area of work which was coterminous with their primary duties as an educator. Figure no. 5 (a) provides a summarized format of the level of teacher participation.

Figure 4 (c): Reasons for Disliking Studies: Student Responses
Figure 5 (a): Teachers’ Level of Participation in Non-teaching Activities

Rather than making the assumption about whether the teachers were facing problems in performing their day-to-day tasks, due to their participation in non-curricular activities, the teachers were directly enquired about it. While majority teachers in Uttar Pradesh (54.5%) did not perceive it as a disturbing element, despite being comparatively more engaged in non-teaching activities, teachers in Himachal Pradesh (57.3%) did see it as a hampering factor; This is reflective of either of these three possibilities: UP Teachers’ uncanny fondness for such activities or duties, their relatively developed capability for multitasking or their gradual socialization into the norm that these tasks are as much fundamental as their curricular responsibilities.

Despite having a larger share in terms of participation in non-curricular duties and also not considering them as a hindrance, majority teachers in Uttar Pradesh, when asked to declare the ideal ratio of involvement in curricular:non-curricular activities, responded 70:30 as the optimum distribution, while their counterparts in Himachal Pradesh, opted for a 50:50 equation. Refer to Figure no. 5 (b) for related responses.
Figure 5 (b): Ratio of Involvement of Teachers in Curricular: Non-Curricular Activities

Satisfaction with Curriculum and Job and Resolution of Conflicts

A comparative analysis of the answers given by the educators of the two states reveals that teachers’ satisfaction with the syllabus was higher in Uttar Pradesh (68.8%), than Himachal Pradesh (60.4%). For Uttar Pradesh, the second most opted issue, besides syllabus being well designed, was that the syllabus was “exhaustive” or “lengthy” (15.6%), while for Himachal Pradesh the foremost was, “too theoretical” or “factual” (27.1%), followed by syllabus not being related to the social milieu or being non-contextual in nature and content (13.6% in HP and 0% in UP). Thus, while the former group was more concerned with the length of the curriculum and the difficulty faced by it in its timely completion, the teachers in Himachal Pradesh vociferously challenged its deep orientation towards fact-based content rather than conceptual knowledge, and how the syllabus was non-comprehensible and non-relatable for the pupils, thus making explaining by educators and understanding by students challenging. Figure no. 6 (a) provides the aforementioned statistics.
Besides the curriculum, majority of the teachers in Uttar Pradesh said that their level of satisfaction with their teaching jobs was medium (neither high nor low), as opposed to Himachal Pradesh, where maximum teachers responded to having high level of job satisfaction. While approximately 3 percent teachers in Uttar Pradesh mentioned their level of satisfaction as low, the corresponding percentage in Himachal Pradesh was nil. When asked about the factors responsible for their medium/low level of job satisfaction, the two factors that outshined all the others, in both the states alike, were too much of non-teaching workload and unsatisfactory remuneration. Refer to Figures no. 6 (b & c) for further details on the question.

Table 6 (a): Satisfaction with Syllabus and Associated Concerns

<table>
<thead>
<tr>
<th>Concern</th>
<th>Uttar Pradesh</th>
<th>Himachal Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Designed / Comprehensive</td>
<td>18.70%</td>
<td>47.90%</td>
</tr>
<tr>
<td>Tough / Pressurizing</td>
<td>2.10%</td>
<td>5.20%</td>
</tr>
<tr>
<td>Too Theoretical or Factual</td>
<td>12.50%</td>
<td>27.10%</td>
</tr>
<tr>
<td>Not Related to Social Milieu / Non-Contextual</td>
<td>0%</td>
<td>13.60%</td>
</tr>
<tr>
<td>Lack of focus on Vocational Studies</td>
<td>10.40%</td>
<td>5.20%</td>
</tr>
<tr>
<td>More English Based or Oriented</td>
<td>3.10%</td>
<td>2.10%</td>
</tr>
<tr>
<td>Exhaustive / Lengthy</td>
<td>12.50%</td>
<td>15.60%</td>
</tr>
<tr>
<td>Could have been made more interesting and engaging</td>
<td>12.50%</td>
<td>11.50%</td>
</tr>
</tbody>
</table>
Furthermore, when asked to mention the reasons they thought were responsible for teachers leaving their jobs, a host of 10 possible factors were given. The responses that were highlighted the most were: less salary and too much of work load, which were surprisingly congruent to the concerns raised in the previous table. Refer to Figure no. 6 (d) for additional facts and figures.

Lastly, the teachers were asked to pick from the three options provided to them regarding how conflicts between them and the administration were resolved, and their responses were as follows:

- Board meetings where the director or head usually has the last say: 50 % in UP and 41.6% in HP
- Collective decision making and democratic voting: 39.6 % in UP and 54.2% in HP
- Conflicts are rarely resolved or looked into: 10.4 % in UP and 4.2% in HP

Thus, maximum respondents in Uttar Pradesh pointed out that contentious issues between the teaching faculty and administration were resolved through a top-down approach and not democratic-consensus based decision making, which was apparently the popular tactic in Himachal Pradesh.
Recommendations

The vital discoveries of this research and their accruing implications and recommendations can be encapsulated with the help of these pointers:

Teacher Education and Training

- The present teaching staff can attend workshops or undergo in-service training regarding the attributes they should inculcate and the undesirable characteristics they should dispose of, based on the combined responses generated by the teachers and students of the two states.
- The discrepancy between the answers given by teachers and students with reference to the punishments administered by the teachers, calls for a rigorous training of the staff in promotion of non-corporal punishment tactics. These strategies are: counselling of students by a professional, warning them rather than punishing them straight away, informing parents, trying to know the reason behind the act and inculcation of values among the wrongdoers to bring about lifetime behavioural changes among them.
- Teachers should be encouraged to utilize technologically advanced teaching aids, and should be trained to use them accordingly. According to respondents, resources like audio-visual aids, recorded lectures, smart boards and smart classes, and advanced training opportunities for teachers, should be made readily available to them.

Teaching Methods

Though maximum teachers in both the states envisaged Ability Based Learning methods, in practice their reliance was more on traditional teaching-learning methods, especially when it came to the descriptive indicators pertaining to UP teachers. Thus, appropriate training can be delivered to teachers to expand their generic pedagogical knowledge associated with multifarious methods of teaching, classroom management, organization tactics, understanding of pupils' learning patterns and their subsequent evaluation. Some of the pedagogical methods that can be learnt from the better performing state (in this case Himachal Pradesh), in terms of actualization of the capabilities of educators and students alike, are: more reliance on audio-visuals aids as it enhances students' engagement and attention; being creative and thinking out of the box in order to organize activities which are engaging and thrilling for the learners; and linking the static course content with the current affairs or contemporary social issues, so that the students can grasp better and relate to whatever is being conveyed.

Miscellaneous Policy Interventions

- The Ministry of Education can take steps to formalize the proposed ratio between curricular and non-curricular activities of teachers as 70:30. This can be achieved by hiring more non-academic staff for these clerical responsibilities, especially the administration and panchayat related works. Besides this, allotment of a Zero Period of 30 to 40 minutes, for the teachers, to deal with some of these tasks, every single day, can reduce their burden to some extent, and not hamper their primary pedagogical prerogatives.
- Besides hectic workload, lack of remuneration or salary was a major concern among the teaching faculty. Official norms denoting the least level of salary or pay scale, according to the level of education, can be formulated and implemented in all schools (private, government or government-aided), so that salaries disbursed below that level would not be permissible. Besides this, an audit system (either overt or covert) is also required to ensure that such provisions are being implemented.
- Rules for resolution of conflicts between the teaching staff and administrative staff can also be formulated so that there is less dependence on directors and head of departments and more on collective decision making and redressal of grievances through democratic voting. Small ballot boxes can be instituted for this purpose and their maintenance would not require much investment.
• The teachers in Himachal Pradesh pointed out that the syllabus was too theoretical or factual, was not related to the social milieu or was non-contextual in nature and content and could have been made more interesting and engaging. These views should be acknowledged by National Council for Educational Research and Training (NCERT) and other curriculum planning and formulating bodies, so that fruitful alterations can be expected in the new National Curriculum Framework that is undergoing formulation at the present moment.

These recommendations and suggestions are a direct manifestation of the findings of the research and if taken care of, can bring forth some commendable progressive modifications in the field of elementary education, in both private and public sector.

Conclusion

With the advent of debates on conceptualization of quality of education, pedagogy has subsequently occupied a predominant space. Scholars from multidisciplinary backgrounds like sociology, economics, political science and philosophy, have delved into the discourse from time to time. This research endeavour was one such engagement with the problem of theorization of quality of education, by focusing on descriptive pedagogical indicators, selected from public policies. The uniqueness of this study lied in its methodology where rather than focusing on learning outcomes of pupils, the perspectives of students were taken into consideration, and this very procedure converted the perception of students and teachers from “receivers of information” and “disseminators of information” respectively, to active participating agents and decision makers, within the classroom. Rather than adhering to quantification of pedagogical indicators only, dealing with the achievement of educational objectives, this paper expanded the domain of research by utilizing open-ended questions, vignettes and counterfactual choice based queries, to ask educators, under the domain of comparative pedagogy, about their opinions on effective pedagogical styles and necessary modifications required, classroom management and organization strategies, utilization of teaching aids and their take on the various aspects of teaching-and-learning in particular, and education in general.

According to NEP 2020, pedagogy and learning processes, rather than merely the accessibility to basic learning amenities, teaching tools or learning outcomes of students, formed the essence of an education system, and an inquiry into the same would result in a well-institutionalized plan for ascertaining quality of education. It was with this intent that the researcher conducted research in the domain of descriptive indicators of quality of education, with special reference to pedagogy, and with this note, she ends her paper, hoping that the preceding pages and their contents did justice to the goal set at the onset of this quest.
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Generating transformative learning futures: Leveraging innovations in assessment to activate sustainability competencies

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Abstract

As younger generations encounter daunting challenges such as climate change, social injustice, and recovery from the COVID-19 pandemic, the imperative of sustainability stands as a fundamental endeavor in the present and future. Education has been identified as a key strategy for facilitating sustainability at both individual and collective levels. However, the link between sustainability and education is complex and dynamic, compelling transformations in what, when, where, how, and why we learn. While these transformations will provide a foundation for education to contribute to the generation of more sustainable futures, this paper explores how further innovations in how learning is assessed can support education in fostering the changes necessary for a better future. By reimagining both the theoretical functions and practical techniques of assessment, education can better capture complex learning outcomes such as sustainability competencies while enabling their application as learners create real-world change. This paper investigates tensions, challenges, and possibilities in assessment in order to propose a vision for reorienting teaching and learning towards sustainability. Through innovations in both the process and purpose of assessment that cultivate more multifaceted, integrated, technology-enhanced, and action-focused approaches, education will become better equipped to advance towards transformative learning futures.

Keywords

Sustainability education, Competencies, Assessment, Educational innovation, Learning futures
Introduction

Of the myriad challenges that younger generations face in the present and the future, the imperative of sustainability stands as perhaps the most fundamental. The pursuit of sustainability will require broad participation and transformations to maintain ecological vitality, cultivate social justice, and remedy economic disparities, while advancing well-being and prosperity across all contexts. Education has been identified as both an area for, as well as a driver of, the transformations that enable sustainable futures (Sachs et al., 2019). This dual capacity of education suggests the need to consider both the types of outcomes at individual and collective levels that can generate sustainability, as well as the necessary innovations in teaching and learning that can facilitate these outcomes. The link between education and sustainability is therefore complex, but also compels change at micro and macro levels. Beyond paradigm changes concerning policy and philosophy, new approaches to the purpose and process of education are also required. Sustainability education scholars have articulated the significance of leveraging efforts towards educational transformation in what we learn, how we learn, and why we learn. Innovations in both research and practice are needed in order to foster these changes, as well as to capture their relevance for broader sustainability impacts.

This paper explores the problems and possibilities of shifting education towards sustainability in order to create transformative learning futures. This investigation entails considering the broader connection between education and sustainability, describing objectives for learners in this context, and reflecting on how innovations specifically in assessment can better align with the prospect of sustainable futures. Enhancing assessment is particularly crucial in this endeavor, as it can be used to not only capture learning, but also enhance it and project it towards application for real-world change. Thus, this paper aims to reflect on potential trajectories of assessment and how innovations might generate transformation in education and for sustainability.

Method

In order to explore how potential innovations in assessment can contribute to transformative learning futures, this paper reviews a wide-ranging set of literature and reflects on the insights that emerge for education and sustainability. The relevant literature entails background on sustainability education and its role in creating sustainable futures, considerations of the objectives of sustainability education, analysis of the status of assessment in this field, and visions for how assessment can evolve to contribute to both quality education and sustainability impact. The practical and theoretical implications of this literature are investigated to establish a foundation for advancing assessment, sustainability education, and the skills for learners to create better futures for themselves and their communities.

The Challenge of Sustainability and the Promise of Education

As a multitude of dynamic, intersecting, and accelerating challenges threaten the stability and prosperity of society, while undermining the ecological systems that humans are embedded in, strategies commensurate to this daunting situation are necessary. Climate change, biodiversity loss, the COVID-19 pandemic, social injustice and inequity are just several of the litany of issues that require action in the present in order to maintain the possibility for future generations to meet their needs. As these complex challenges are exacerbated by inadequate action and continued behaviors that jeopardize the proper functioning of social-ecological systems, the objective of sustainability has gained increased relevance. While definitions of and approaches to sustainability are many (Bettencourt & Kaur, 2011), it can broadly be considered as the pursuit of maintaining appropriate boundaries for ecological systems without surpassing tipping points that can lead to catastrophic change, while also fostering adequate social foundations that support the well-being of all humans in both the present and the future (Leach et al., 2013). Sustainability as a field of practice, research, and policy grapples with balancing ecological, social, and economic needs in addition to managing the influences, both supportive and hindering, of political entities and technological change.
Amidst this complexity, uncertainty, and change, global organizations, such as the United Nations and UNESCO, and local initiatives have sought strategies, including education focused on sustainability, that can enable progress towards sustainability. Sustainability education seeks to enable learners to participate in creating a more sustainable future for themselves and others, through critical reflection, civic engagement, and personal and professional action (Leicht et al., 2018). Thus, education has been promoted as a key strategy for fostering sustainability. For example, UNESCO has championed education’s ability to positively influence sustainability through a decade focused on enhancing policy and integration between 2005 and 2014 (UNESCO, 2005), a follow-up set of priority action areas (UNESCO, 2014), and a recent roadmap towards action to transform education systems in pursuit of the SDGs (UNESCO, 2020). These efforts have led to increased attention in international and national policies, new approaches to teaching and learning, and a burgeoning collection of empirical and conceptual research.

While other strategies such as adaptations in political, social, and economic decisions and behaviors at both macro and micro levels are essential for fostering sustainability transitions, education has been highlighted as a key driver for several reasons. First, sustainability education can help learners to become more aware of sustainability challenges and motivated to address them. Second, it can equip learners with relevant knowledge, skills, and attitudes to take action and develop solutions to local and global issues. Third, increased access to education can support a wider range of learners to understand the importance of sustainability and how to individually and collectively work towards it. The Sustainable Development Goals have expanded on these reasons by identifying quality education as one its seventeen objectives for a global vision of sustainability. Additionally, education can contribute towards facilitating many of the other goals, suggesting it as not only an objective but a cross-cutting force for achieving a global agenda for sustainability.

Achieving both immediate and broad sustainability goals through the meaningful contributions of education requires that education be reimagined to better align with and support sustainability. Scholars of sustainability education have critiqued common and traditional approaches to education as driving not the generation of sustainable futures, but rather the mindsets and behaviors that have contributed to sustainability problems. These scholars position standard educational practices, particularly in Western industrialized nations, as leading to the neoliberal assumptions that foster overconsumption, disconnection from nature, inequity, and a host of other habits detrimental to sustainability. Thus, education has been a part of the problem, but can become a part of the solution by integrating a concern for sustainability. Specifically, this rethinking of education will entail transformation in what is learned, how it is learned, and why it is learned. The primary endeavor of research and practice in sustainability education has been to articulate and operationalize these educational transformations by reorienting the purposes and processes of teaching and learning.

Through this endeavor the field has developed a robust suite of objectives, principles, and pedagogies. Though approaches to sustainability education are diverse, often influenced by context and values and adaptable to the needs of complex teaching and learning situations and objectives (Bianchi, 2020), there are a few common themes that define the boundaries of the field. Sustainability education often emphasizes experiential learning (Dieleman & Huisingh, 2006), employing approaches such as project-based learning (Lehmann et al., 2008), place-based education (Caniglia et al., 2016), participatory action research (Burmeister & Eilks, 2012), and transdisciplinary collaboration (Scholz et al., 2006). These approaches aim to be transformative and transgressive (Lotz-Sisitka et al., 2015), enabling learners to think critically and develop new perspectives oriented towards sustainability. These perspectives are embodied in two types of outcomes for learners in sustainability education: (1) the development of informed, skilled behaviors, and (2) the capacity to think critically about sustainability problems and potential solutions (Vare & Scott, 2007). Through an open and reflexive learning process geared towards social action as well as discovery (Barth & Michelsen, 2013), sustainability education seeks to cultivate learning that is both personally meaningful and socially significant (Sterling, 2010).
Activating Sustainability Change Agents

The broader goals of sustainability education can be observed in a more specific objective for the field: the development of competencies that empower learners to act as sustainability change agents. Several prominent efforts have attempted to define the competencies that can support learners in addressing sustainability challenges. This has led to growing consensus on a key competency in sustainability framework, which serves as a reference guide for learning objectives in sustainability as well as an outline for problem-solving processes. The key competencies in sustainability entail a series of “functionally linked complex[es] of knowledge, skills, and attitudes that enable successful task performance and problem solving” within the context of sustainability (Wiek et al., 2011, p.204). Promoting the development of these competencies and their application in personal, professional, and social settings is a primary task for the field of sustainability education.

The framework established by a progressive set of work (Wiek et al., 2011, Wiek et al., 2015, Brundiers et al., 2020) describes the following interrelated set of competencies as relevant for learners to address sustainability problems both individually and collectively:

- **Systems Thinking Competency:** The ability to collectively analyze sustainability problems and complex systems across different domains (or sectors) and scales.
- **Values Thinking Competency:** The ability to collectively map, specify, apply, reconcile, and negotiate sustainability values, principles, goals, and targets, informed by concepts of justice, fairness, responsibility, in collectively assessing the (un)-sustainability of current and future states of social-ecological systems and collectively creating and crafting sustainability visions for these systems.
- **Futures Thinking Competency:** The ability to collectively anticipate how sustainability problems might evolve or occur over time, and the ability to collectively analyze, evaluate, and craft rich “pictures” of future visions, considering evidence-supported alternative development pathways.
- **Strategic Thinking Competency:** The ability to collectively design and implement interventions, transitions, and transformational actions, accounting for unintended consequences and cascading effects, while leveraging assets, mobilizing resources, and coordinating stakeholders to overcome systemic inertia, path dependencies, and other barriers to reach envisioned outcomes.
- **Interpersonal Competency:** The ability to initiate, facilitate, and support different types of collaborative and participatory sustainability research and problem-solving.
- **Integrated Problem Solving Competency:** The ability to apply different problem-solving frameworks to complex sustainability problems and develop viable solution options, by meaningfully integrating problem analysis, sustainability assessment, visioning, and strategy building.
- **Intrapersonal Competency:** The ability to be aware of one’s own emotions, desires, thoughts, behaviors, and personality in relation to sustainability values and resilience-oriented self-care, as well as the ability to regulate, motivate, evaluate, and continually improve oneself drawing on competencies related to emotional intelligence and social and emotional learning.
- **Implementation Competency:** The collective ability to realize a planned solution toward a sustainability-informed vision by monitoring and evaluating the realization process, addressing emerging challenges and adjusting, and recognizing that sustainability problem-solving is a long-term, iterative process between planning, realization, and evaluation.

Rather than outlining a prescriptive set of outcomes, the key competencies provide a dynamic framework for learning goals and impacts in sustainability education. How these competencies are developed and applied is not only shaped by broader context and values, but is a matter of both the ability and willingness of the learner (Bianchi, 2020). In order to foster not only the capacity to address sustainability problems but also the motivation to do so, experiential and affectively engaging learning experiences are necessary (NASEM, 2020). Approaches in sustainability education have sought to foster this type of learning environment by aiming to be: (1) counter-hegemonic, by requiring the exposure and questioning of stubborn routines; (2) transversal, by requiring the involvement of individuals, groups, and collectives; and, (3) profound, by affecting moral standards and value systems (Wals & Rodela, 2014). Yet, despite these principles and the wealth of pedagogical approaches that the field utilizes, the process of cultivating the key competencies in sustainability and projecting them towards implementation remains complex and challenging (Lozano et al., 2017).
The difficulty in operationalizing appropriate teaching and learning strategies is exacerbated by the demands of orienting education to respond to dynamic sustainability challenges in society. In engaging with this task, educators and researchers must grapple with the following question: As the purposes and processes of education evolve, as well as the sustainability challenges that we face, what skills and strategies can drive innovation and transformation for learning, action, and change? The competencies and approaches described above provide an initial response to this question, but further advances are needed to strengthen the contribution of sustainability education to the broader educational field and to the pursuit of more sustainable futures. In this paper I propose that investigating potential innovations in the assessment of learning, particularly of sustainability competencies, can facilitate more meaningful learning and its transfer into action for sustainability.

**The Need to Reimagine Assessment**

While the different aspects of teaching and learning, such as objectives and pedagogies, are interconnected, I suggest that assessment is an especially crucial area to examine in the pursuit of more robust sustainability education. Assessment is relevant to consider under this purpose for several reasons. First, assessment has been underexplored in sustainability education, leaving opportunities for distinct advances that can support the efficacy of the field in pursuing its goals. Second, assessment increasingly dictates what is taught and learned and how, shaping educational experiences as outcomes-based education further infiltrates global educational discourses. Third, because of the key role that education plays as a driver of sustainability, valid and reliable assessment is critical for understanding if learning is adequate to contribute to creating sustainable futures and how it might do so. Fourth, as external changes such as the rise of digital learning shape education's evolution and lead to more complex learning outcomes, innovations in assessment will be critical to appraise the impacts of these changes. Finally, assessment is relevant to investigate because how it is practiced comes to embody the tensions and possibilities that we face in education. In order to reorient education towards sustainability, negotiating these tensions and possibilities will be an essential task.

In the context of sustainability education, assessment has been underexplored leading to a lack of rigorous theoretical understandings or robust practical methods (Cebrián Bernat et al., 2019). While learning outcomes in sustainability education, such as competencies, present an inherent difficulty to assessment due to their dynamic complexity, there is a clear opportunity for advances in research and practice to address the gap in the field. Recent work has begun to engage more seriously in this area, creating foundations for more meaningful understandings and potential innovations. For example, Redman et al. (2021) have synthesized different approaches to sustainability competency assessment, categorized into three general clusters: (1) self-perceiving based (e.g., scaled self-assessment, reflective writing); (2) observation-based (e.g., performance observation, regular course work); and, (3) test-based assessment (scenario tests, traditional tests). They also describe the limitations of many of these approaches, such as the lack of attention to developing robust, reliable, and valid assessment tools, which has been exacerbated by the ambiguity of learning outcomes. To overcome some of these shortcomings, they suggest that triangulation, both within clusters and between them, is perhaps the most currently effective way to address inadequacies. However, potential innovations such as in-vivo simulations and computer-based assessments loom as intriguing options to strengthen the field.

Remaking assessment in sustainability education will require more than implementing cutting-edge methods or integrating techniques from different fields. As in the case of sustainability more broadly, technological and practical upgrades are only one part of a more holistic solution. With sustainability competency assessment, in addition to new potential methods, the field also requires a deeper examination of the normative assumptions and aspirations of assessment. Just as efforts in sustainability education have sought to align objectives and pedagogies with the goals of the field, so too must assessment be more deeply oriented to fit within the pursuit of education that leads to learning, action, and change for sustainability. Thus, I argue that sustainability education can serve as an example in rethinking the theoretical functions and practical techniques of assessment in order to recalibrate teaching and learning towards sustainability, while opening emergent possibilities for transformative learning futures.
Before exploring this vision further it is relevant to consider the meaning of several key terms that this paper will discuss. The first is theoretical functions of assessment, which signify the normative assumptions and purposes to which assessment is leveraged in capturing or promoting learning. More simply, this can be considered the why of assessment. While standard conceptions of assessment are geared towards measuring change in learning over time, there are many richer functions to which assessment can be purposed that might be relevant for sustainability education. The second term is practical techniques of assessment, which involves the methods, tools, and strategies through which learning comes to be understood and evaluated. This can be considered the how of assessment. Both the theoretical functions and practical techniques of assessment, the why and the how, influence what is being assessed as well. In this paper I reflect on these dimensions of assessment in order to consider how they can be reoriented towards the generation of transformative learning futures. I define this to entail the adaptation of education to engage with, enhance, and enable the prospect of sustainability through education that is personally meaningful and socially impactful, in addition to being equitable and just. The rest of this paper will elaborate on these areas of assessment in order to envision pathways towards innovation in education that contributes to sustainability.

**Tensions, Challenges, and Possibilities in Assessment**

The tensions embodied in the choices and practices of assessment are relevant for critically analyzing the purposes and processes of education more broadly. In the context of sustainability these tensions are exacerbated by ambiguities and complexities in the types of learning outcomes being evaluated. But by reflecting upon these tensions and participating in discourse on how to reconcile or engage with them, the efficacy of assessment approaches to capture and support learning can be improved. The key tensions in the field of sustainability education, which are demonstrated particularly in assessment, include:

- **Instrumental vs. Emancipatory**: Achieving specified outcomes that contribute towards the creation of more sustainable futures is a key objective for sustainability education. Reaching this goal often requires instrumental approaches that cultivate technical abilities to practice sustainability. However, the need for instrumental approaches does not preclude the relevance of emancipatory approaches (Wals et al., 2008). Emancipatory approaches aim to liberate learners, facilitate their critical reflection and action in open-ended ways, and foster the personal subjectification (Biesta, 2015) of learners to seek individual flourishing and fulfillment. The assessment of learning oriented towards either end of the instrumental and emancipatory spectrum remains challenging because outcomes can range from rigidly defined to elusive and abstract.

- **Individual vs. Collective**: Sustainability education also experiences tensions between understanding learning outcomes for individuals and how those compare with outcomes on a more collective level. In order to achieve meaningful sustainability goals both individual and collective changes must occur, but the learning to foster shifts at both levels can entail interrelated yet often divergent strategies. Regarding assessment, traditionally methods have prioritized measuring individual learning, yet this conflicts with the aspirations of sustainability to achieve holistic, participatory changes. Thus the field must grapple with how it engages individuals and relates their learning to collective transformations, as well as how it understands and assesses this process.

- **Performance vs. Cognitive**: Because sustainability education is defined by its action-orientation, the development of skills to practice sustainability is a key objective. Assessing the performance of these skills is thus a primary task for the field as it seeks to determine if learners are capable of acting for sustainability. Yet skills are just one-dimension of the learning process in sustainability education. As with all education, sustainability education aims to also develop knowledge, awareness, and other cognitive abilities. As the definition of key competencies in sustainability described above explained, the learning outcomes cultivated in the field entail a combination of both of these dimensions. However, this complexity creates issues for how different types of learning are assessed in order to determine the impact of sustainability education learning experiences.
• **Ability vs. Willingness:** Similar to the tension between assessing performance or cognitive outcomes, there can be conflicts between fostering and ultimately evaluating ability versus willingness. While sustainability education has sought to develop skills for learners to address sustainability problems, the field has also aimed to support learners to develop mindsets, motivations, and other attitudinal factors that enable personally- and socially-relevant actions. Just as in other fields, this has led to a distinct focus on how to develop and assess cognitive, socio-emotional, and behavioral learning outcomes (Rieckmann, 2017). Yet particularly when willingness is so essential not only to learning outcomes but to impacts for society at-large, fostering this capacity without sacrificing or undermining learners’ abilities to create change is a demanding task.

• **Traditional vs. Innovative:** Sustainability education has often positioned itself as an advancement upon standard approaches to education, operating at the cutting edge of both purpose and process. Yet in attempts to mainstream sustainability education the field must straddle traditional and innovative approaches in order to both fit within existing systems and begin to transform them. In assessment this tension plays out in the need to utilize methods commensurate with the complexity of learning outcomes in sustainability education, while also using methods accessible and relevant for instructors and learners. The challenge of progress versus inertia impacts all of education but is especially heightened in sustainability education as it recognizes the immediacy of social-ecological challenges that compel educational change.

• **Summative vs. Formative:** More particular to assessment, there is a longstanding tension between summative and formative approaches, though these strategies are not mutually exclusive. Summative assessments have commonly been positioned as assessment of learning that occurs at the end of a learning experience, while formative assessment occurs throughout the learning experience as assessment for learning (Wiliam, 2011). Determining the appropriate roles for both approaches to assessment, while also rethinking how they are deployed in the activation and appraisal of sustainability competencies, remains an underexplored facet of sustainability education.

In addition to the tensions faced in sustainability education, there are further challenges that the field faces in determining meaningful, efficacious ways to assess learning. The foundational challenge for assessment in sustainability education is that the field aims to develop learning outcomes that are complex and dynamic, such as the key competencies in sustainability. In trying to capture the meaning and progression of learning in this context sustainability competency assessment is tasked with grasping a moving, multifaceted target. While work is needed to more clearly define relevant learning objectives for the field, in both theory and practice, as well as how to operationalize them, more robust assessment strategies would contribute to resolving this issue by providing evidence to draw on regarding relevance and effectiveness.

The next set of challenges apply beyond the realm of sustainability education, but are particularly relevant because they resist or accentuate the field’s key features. First, digital innovations and increased access have subverted more familiar learning experiences and led to dynamic and dispersed contexts for teaching and learning. Especially as the COVID-19 pandemic has ushered in the need to test new formats for education, assessment strategies will need to evolve to align with learning that occurs in online settings across the globe at multiple time intervals in a variety of forms and for a range of purposes. Next, as society and education elevate their attention to issues of justice, equity, diversity, and inclusion, assessment approaches will need to develop meaningful strategies for engaging with these concerns. Progress in this area entails a recognition that existing approaches to assessment have often advanced problematic racist, colonial, or neoliberal agendas, though more socially just ways of assessing learning are possible (Inoue, 2015). A further challenge is the very understanding of knowledge and action in a world that has been deemed “post-truth” (Sismondo, 2017). The act of assessment often assumes that there is a “correct” answer or at least that some outcomes are better than others. However, when social, cultural, and political trends, fueled by the media, surpass questions of objectivity towards the active generation of “alternative facts”, the credibility and social currency of learning is often unfortunately undermined. Thus, assessment has to grapple not only with challenges and changes in education, but also with the volatile and pervasive influences of socio-political forces.

Despite the challenges faced in designing effective assessment approaches, there are still possibilities that can guide innovations in both the theoretical functions and practical techniques of assessing learning in sustainability education and beyond. Several scholars in fields outside of sustainability education (e.g., Croft et al., 2019; Conrad & Witthaus, 2021) have identified several overlapping and potentially synergistic areas for innovation in assessment. I explore the implications of adapting these innovations for use in sustainability education below:
• **Integrated and Pluralistic Approaches**: This innovation entails assessments that do not appear as separate or after the learning experience, but rather are integrated within it and blend multiple methods and functions to strengthen the validity and authenticity of assessments. In sustainability education, integrated approaches might transcend traditional evaluations of learning to assess competencies in action as learners participate in experiential or applied activities. The pluralistic dimension entails making assessments more robust by employing different forms that can interact to more fully capture, or even support, learning. Together these two aspects enable assessment to become a multifaceted feature of learning rather than an isolated element.

• **Performance-Based Simulations**: These types of assessments recreate scenarios that replicate real-world situations and allow students to test their emerging knowledge and skills in a risk-free environment. Simulations have provided a way to foster and evaluate learning in many fields, such as law, aviation, and particularly medicine (Abdulmohsen, 2010; Aggarwal et al., 2010). In a field that is practice- and action-oriented like sustainability, simulations present a useful form of pedagogy and assessment. Strategies such as in-vivo assessment, which develops real-time learning evaluations through performance observation, can support learners in sustainability education to better practice and contextualize their learning, which may lead to future application (Fourrier, 2020). As learning becomes increasingly oriented towards the need for action for social change, simulations and assessment through observation become more relevant to assess learning as it occurs.

• **External Evaluation and Micro-Credentialing**: As learning opportunities emerge beyond formal education spaces and engage non-traditional learners or professionals looking to up-skill, assessment approaches are finding new ways to credit, categorize, and capture learning. With learning occurring increasingly outside of the classroom, the responsibility of assessment has opened up to include others outside of instructors. While this has been common in professional accreditation schemes, this trend is becoming relevant at new scales and scopes. For sustainability education, this has meant embracing its transdisciplinary principles in not only pedagogies and potential outcomes, but also how the impact of those activities is assessed. As learning for sustainability seeks to empower learners to create change in their communities, stakeholders such as local policy-makers or business owners become relevant evaluators of learning to complement more standard approaches. External evaluation has also been connected to micro-credentials, which recognize learning at different intervals or units than a semester-long course and create new possibilities for what is assessed and how, while also providing motivations for unique learning progressions and pathways.

• **Artificial Intelligence and Machine Learning**: As technologies gain in their fidelity and integration into educational systems, advances in artificial intelligence and machine learning will increasingly contribute to reshaping assessment practices. These two technological innovations enable not only the collection of more comprehensive and nuanced data on learning, but also more responsive and personalized feedback possibilities (Chen et al., 2020). While leveraging technological advances for assessment is not without drawbacks, they have the potential to greatly accelerate the efficiency and scalability of assessment. Utilizing these approaches might also open up possibilities for what can be assessed as the technologies allow for evaluation and synthesis of complex human behaviors. In sustainability education, artificial intelligence and machine learning may facilitate better understanding of how learners become poised to act as sustainability change agents as well as the potential impacts that their learning can create for sustainability transitions. Ultimately, these powerful data sources can equip assessment approaches to excel at a greater magnitude and perhaps with greater precision, amplifying both assessment of and for learning.

While there are additional areas for innovation beyond those described above, these potential advances provide an idea of what is possible for assessment. Progress in how learning is assessed, as well as the ways that assessment methods are leveraged to facilitate further learning, will play a key role in generating transformative learning futures. For sustainability education, potential innovations in assessment are needed not only to capture the development of complex learning outcomes such as the key competencies in sustainability, but also to support and contextualize the ways in which learning can contribute to creating more sustainable futures.
Discussion

Innovations in assessment, particularly those that align with the purposes and processes of sustainability education, can support the generation of transformative learning futures. In reimagining assessment for sustainability and transformation, several shifts in the theoretical functions and practical techniques of assessment are necessary. These shifts, elaborated below, will operate not only in the why and how of assessment, but also the what, when, and where (Table 1).

- **Why**: The first shift for assessment is to reimagine its normative assumptions and purposes. This transition will entail moving from a technical, measurement-focused perspective towards an emphasis on not only detecting learning, but also helping to enhance it and support its application. In driving these changes, the experiential, action-oriented framework provided by sustainability education might help to influence not only what assessment looks like, but the ways that it contributes to reorient education towards sustainability.

- **How**: The next shift for assessment is to move beyond traditional methods such as tests, written reports, and other common approaches. While there can still be a place for these strategies, innovations in assessment can lean more towards authentic, real-time, and multifaceted approaches. These dynamic approaches are more closely aligned with evaluating complex learning outcomes such as sustainability competencies. They are also synergistic with experiential learning activities where the form of assessment not only determines learning but aims to facilitate it.

- **What**: Another shift for assessment is to focus on assessing different types of learning outcomes. Standardized tests exemplify the common approaches to what education commonly seeks to assess. These tests focus on cognitive outcomes such as knowledge and awareness or the development of relevant skills that can be applied in professional settings. Innovations in assessment can surpass these approaches, which heavily embody individualistic and neoliberal values, to emphasize dynamic competencies that are relevant in personal, professional, and social settings. Assessments can also shift to examine not only ability but willingness and the mindsets that can support sustainability.

- **When**: The next key shift for assessment is to create greater range in when assessment occurs. Though there are many different practices for integrating assessment into learning experiences, the dominant approach has been to utilize summative assessment to measure learning at the conclusion of an activity or course. Yet assessment can be employed in more nimble and generative ways throughout the learning experience. Prioritizing formative assessment as a tool to facilitate and appraise learning during the process can help learners to understand how their competencies are developing and what they need to do to keep growing. This dynamic process parallels the iterative nature of solving complex sustainability problems, suggesting that assessment is also appropriate beyond the learning experience to ensure that learning remains relevant amidst evolving sustainability challenges.

- **Where**: The final shift for assessment concerns the settings for investigating learning. While common approaches have been commonly conducted in the classroom, innovations in assessment can expand into more diverse contexts. Just as sustainability education emphasizes the significance of real-world, applied learning, so too can assessments become centered on what happens not just in the classroom but in the community. Seeking to evaluate not only learning but real-world impact can be a key shift for assessment. Yet utilizing technological advances to assess learning in digital, virtual, and artificial settings will also become increasingly important. Thus, the spaces for assessment can cross boundaries that have previously confined the possibilities of learning.
Table 1: Shifts to Reimagine Assessment for Sustainability and Transformation

<table>
<thead>
<tr>
<th>Dimension of Assessment</th>
<th>Traditional Approaches</th>
<th>Sustainable &amp; Transformative Learning Futures</th>
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<tbody>
<tr>
<td>Why</td>
<td>To determine how the quality of learning aligns with academic and professional standards</td>
<td>To not only capture, but enhance and advance, learning in the present and future for social-ecological impact</td>
</tr>
<tr>
<td>How</td>
<td>Tests, scaled self-assessment, written reports</td>
<td>Performance observation, technology-enhanced, multifaceted methods</td>
</tr>
<tr>
<td>What</td>
<td>Knowledge, skills</td>
<td>Competencies (ability and willingness)</td>
</tr>
<tr>
<td>When</td>
<td>Emphasis on summative approaches at the end of the learning experience</td>
<td>Throughout the learning experience and beyond</td>
</tr>
<tr>
<td>Where</td>
<td>In the classroom</td>
<td>Classroom, computer, and community</td>
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</tbody>
</table>

In order to enable these shifts, transformations will need to be negotiated in both the theoretical functions and practical techniques of assessment. Critically engaging with these dimensions can provide a foundation for determining innovations that enable assessment to better align with the tenets of sustainability education. These innovations can also activate the possibility for learning futures that foster deeper, personalized learning that is also responsive to social-ecological challenges. In order to achieve these goals and orient innovation towards sustainability, there are several broad tasks for research and practice in assessment. First, more robust assessment methods that are valid and reliable in assessing complex learning outcomes must be developed. Second, assessment approaches must seek to enhance authentic learning through multifaceted, integrated strategies. Third, assessments must be designed to facilitate reflection and guide learning towards application. And fourth, assessments must leverage opportunities to not only capture learning, but also enable its impacts expressed as action and change.

Conclusion

This paper has aimed to explore how reimagining assessment is an essential endeavor in reorienting education towards transformative and sustainable futures. By reviewing and reflecting on a range of literature and proposing ways that innovations can overcome tensions and challenges in both the theoretical functions and practical techniques of assessment, this paper has offered insights for sustainability education and the broader educational landscape. These insights are important because they support critical contemplation on the purposes and processes of education in a world that is faced with complex social-ecological challenges. Significant efforts lie ahead to generate viable pathways towards transformative learning futures that activate progress towards sustainability. Yet by recognizing the opportunities for innovative assessments, examining the crucial assumptions embodied in the how and why of education, and exploring the possibilities of sustainability education, advances can be made to enhance the efficacy of education to facilitate learning, action, and change. Future conceptual and empirical research should continue to sketch these possibilities as well as strategies to support them, while also testing the impacts produced by innovations in assessment. Leveraging these innovations for transformation will be a demanding task, but by seeking to make real visions for education that are diligent yet daring, we might be able to pursue a better, more sustainable future.

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Higher education teachers’ perspectives on technology use in emergency remote teaching during the global pandemic: A systematic literature review

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Abstract
COVID-19-related educational research has been growing rapidly since the initial implementation of emergency remote teaching (ERT) across education systems. However, few attempts have been made to provide a holistic view of research on the use of technology in higher education that uniquely emerged from the disruptions and anomalous events brought by the coronavirus outbreak. In an effort to fill part of this lacuna, this systematic review examines the literature concerning the use of technology in ERT in higher education settings worldwide. Our review synthesises 32 peer-reviewed journal articles of original empirical research studies written in English and/or Chinese, with a primary focus on the perspectives of humanities, arts, and social sciences teachers. The majority of the included studies have a local or national remit and were conducted in Asian and European settings. The findings of this review shed light on the changing teacher-student relationships in the new physical-virtual spatiality and underscore the importance of the affective aspect of teaching during a crisis. We also suggest that future research scrutinises the use of terminology variations to avoid conflation of concepts with nuanced differences (such as “online teaching”, “e-learning”, and “distance education”). Finally, this paper calls for a careful re-conceptualization of technology and education, which is largely absent from the literature reviewed, and yet crucial to reimagining and reshaping the use of technology in higher education teaching in the years to come.

Keywords
Education, online, pandemic, technology use, university teaching

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1. Background and Objectives
Since early 2020, the COVID-19 pandemic has markedly upended education and created significant challenges for the higher education (HE) sector across countries (Crawford et al., 2020). Many HE institutions made a hasty transition from predominantly physically proximate face-to-face teaching (hereafter referred to as “face-to-face teaching”) to emergency remote teaching. Recently coined by Hodges et al. (2020), the term “emergency remote teaching” (ERT) describes the shift to remote teaching in an emergency as a quick and provisional solution to continue teaching and learning during disruptive times. Whilst “technologies” are often used in ERT for teachers and students to communicate and access relevant information, the term “technologies” can be construed as substantively different entities across contexts (this will be further discussed in Section 4.1). On a side note, this paper uses the term “technologies” in the plural form to refer to a wide range of technical artefacts that can be used for education purposes, which includes various electronic hardware devices, software systems, and online services. The term “technology” in its singular form, on the other hand, is used when referring to the broader concept of technology, encompassing both the technical aspects and the socio-cultural context of technology use in teaching and learning.

In spite of a growing body of literature on ERT, few studies (Gorden et al., 2020; Stewart, 2021) have reviewed this particular area of research. Our systematic review represents one of the first efforts to fill this gap in the literature by focusing on teachers’ perspectives. With this objective in mind, we formulated the research questions for this review as follows:

What technologies were used by HE teachers in ERT?
How were these technologies used by HE teachers in ERT?
How prepared were HE teachers for using technologies in ERT?
What attitudes did HE teachers have towards using technologies in ERT?
What were the factors influencing technology use by HE teachers in ERT?

Since synthesis was still underway at the time of the Yidan conference, in May 2021, this paper only reports the methods and preliminary results of the systematic review. Some of the major ERT implications for teachers will be discussed towards the end of this paper.

2. Research Methods

2.1 Eligibility criteria
In respect of the objective of this review, we specified and applied a set of inclusion/ exclusion criteria to guide the selection of appropriate publications for this review (see Table 1). The publication types are restricted to journal articles written in English and/ or Chinese, which report original empirical research studies and have undergone a peer-review process. Also, this review only includes articles that focus on technology use in ERT, from teachers’ perspectives and in HE settings. HE in this review corresponds to Levels 6 to 8 of the International Standard Classification of Education (UNESCO Institute for Statistics, 2012). As the focal areas of study pertain to the immediate and short-term changes in teaching ensued from the spread of coronavirus, we restrict study eligibility to articles published in 2020 (including those published online ahead of print that year) and collect data from teachers in HE settings during or after the outbreak of COVID-19. Considering that related reviews have been conducted on science, technology, engineering, mathematic, and medicine (STEMM) education (Gordon et al., 2020; Amunga, 2021), this systematic review only encompasses studies with at least 50% of teacher participants from the humanities, arts, and social sciences (HASS) disciplines. Using the Higher Education Classification of Subjects (Higher Education Statistical Agency, n.d.) and the Common Aggregation Hierarchy (CAH) disciplinary groupings, we include studies that focus on HASS subjects which can be readily mapped against CAH14 to CAH23 subject groups.
Table 1: Inclusion/ exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
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<tbody>
<tr>
<td>Publication types</td>
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<tr>
<td>Peer-reviewed original empirical research journal articles</td>
<td>Books, reviews, opinion/ reflection pieces, conference proceedings, and non-peer-reviewed articles</td>
</tr>
<tr>
<td>Publication date</td>
<td></td>
</tr>
<tr>
<td>Published in 2020 (including those published ahead of print in 2020)</td>
<td>Not published in 2020</td>
</tr>
<tr>
<td>Languages</td>
<td></td>
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<tr>
<td>Written in English and/ or in Chinese</td>
<td>Written in other languages than in English or Chinese</td>
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<tr>
<td>Focus of study</td>
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<tr>
<td>Focus on technology use in ERT from teachers’ perspectives</td>
<td>Focus on technology use in non-teaching domains or emphasis other stakeholders’ perspectives than the teachers’</td>
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<tr>
<td>Settings</td>
<td></td>
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<tr>
<td>Data collected during and/ or after the COVID-19 outbreak in higher education settings</td>
<td>Data collected before the COVID-19 outbreak and/ or in non-higher education settings</td>
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<tr>
<td>Disciplinary areas</td>
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<tr>
<td>At least 50% of higher education teacher participants are from humanities, arts, and social sciences disciplines</td>
<td>Over 50% of higher education teacher participants are from science, technology, engineering, maths, and medicine (STEMM) disciplines</td>
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</table>

Studies that do not fulfil any of the above criteria were excluded. In particular, reflection pieces (such as practitioner or personal narratives, auto-ethnographies, and studies where the researcher and the researched are identical) and opinion pieces or editorial commentaries are not within the purview of our review. We are aware that many teaching faculty members have published articles sharing insights based on their own ERT experiences. However, these pieces are excluded in that a great number of them do not report the methodology used and are not as systematically organized as most of the other peer-reviewed journal publications.

2.2 Search strategy

An initial electronic search of 14 databases (three of which are Chinese databases) was performed on 13 January 2021. Boolean combinations of variations of four keywords, namely “higher education”, “technology”, “teaching”, and “COVID-19” were utilised in the search. Condensed versions of the search string were used due to the limits placed on the search input length by different databases (see Appendix 1).

2.3 Selection and screening

Figure 1 exhibits the PRISMA flow diagram of this systematic review (Page et al., 2021). A total of 4,204 records indexed in 14 databases were collated, with 2,788 resultant records after de-duplication. Then, we independently applied the above eligibility criteria and screened 20 papers by title and abstract. Since the inter-rater agreement was 100%, the corresponding author proceeded to perform title and abstract screening of all records. After excluding 2,659 records, only 129 remained for full-text eligibility assessment. Meanwhile, a further 16 records were identified from other sources (including manual Google searching, database search alerts, and backward citation searching of articles whose full texts are screened for eligibility).

Together, the full papers of 145 studies (129 articles from database search and 16 additional records from other sources) were retrieved and examined in depth. From April to May 2021, we contacted authors of 23 articles to clarify missing information, of which 6 articles are eligible for inclusion in this review. The other 17 articles were excluded: 5 of them do not fulfil the inclusion criteria, 5 other studies did not collect the missing information that is relevant to our review, and authors of the remaining 7 studies did not respond to our request or share the information because of confidentiality reasons.
**Figure 1** – PRISMA 2020 flow diagram for systematic review (Page et al., 2021) (Retrieved from [http://prisma-statement.org/prismastatement/flowdiagram.aspx](http://prisma-statement.org/prismastatement/flowdiagram.aspx))

<table>
<thead>
<tr>
<th>Identification of studies via databases</th>
<th>Identification of studies via other sources</th>
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<td>Records identified from 14 databases on 13 January 2021: (n = 4,204 in total)</td>
<td>Records identified from other sources (n = 16 in total):</td>
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<td>Scopus (n = 839)</td>
<td>Google search (n = 4)</td>
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<td>Web of Science (n = 331)</td>
<td>Search alerts (n = 9)</td>
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<td>ProQuest (ERIC included) (n = 371)</td>
<td>Backward citation searching (n = 3)</td>
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<tr>
<td>Records excluded: (n = 103)</td>
<td>Reports retrieved and assessed for eligibility (n = 15)</td>
</tr>
<tr>
<td>Wrong type (n = 19)</td>
<td></td>
</tr>
<tr>
<td>Not COVID-19 context (n = 18)</td>
<td></td>
</tr>
<tr>
<td>Not higher education (n = 3)</td>
<td></td>
</tr>
<tr>
<td>Wrong discipline/ no information on discipline (n = 35)</td>
<td></td>
</tr>
<tr>
<td>Not focus on technology use in educational contexts (n = 2)</td>
<td></td>
</tr>
<tr>
<td>Not teachers' perspectives (n = 18)</td>
<td></td>
</tr>
<tr>
<td>Low quality (n = 8)</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Articles included for synthesis (n = 32)</td>
<td>Articles included from other sources (n = 6)</td>
</tr>
<tr>
<td>(English: n = 28; Chinese: n = 4)</td>
<td>(English: n = 2; Chinese: n = 2)</td>
</tr>
</tbody>
</table>

*Only the top 100 results from Google Scholar (sort by relevance) were included.

*CNKI, CQVIP, and Wanfang are Chinese databases.

*In April and May 2021, authors of 23 articles that do not specify the faculty distribution of teacher participants were contacted and asked for further information about their studies. Articles that do not collect or disclose teachers' discipline distribution are excluded.
2.4 Content extraction and quality assessment

In the initial round of full-text screening, articles that do not meet the inclusion criteria were excluded. Shortly thereafter, the corresponding author drafted an extraction form via Google Forms and piloted it on three of the remaining papers. The authors then discussed the form and developed it into an extraction grid using Microsoft Word. Both authors used the revised grid to extract the content of two full papers independently. There were only minor discrepancies, all of which were reconciled in subsequent communications.

Immediately after content extraction, the quality of each article was evaluated, drawing on a tool originally developed for Oancea et al. (2021). Therefore, also embedded in the content extraction grid is six quality assessment criteria: (1) the strength of conceptualization or theory, (2) rigor in argument and empirical study, (3) appropriateness of approach, (4) substantiation of conclusions and recommendations, (5) thoughtfulness of discussion and interpretation, and (6) relevance to this particular systematic review (see Table 2). Each of the criteria has a maximum score of four.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Strength of conceptualisation or theory</th>
<th>Rigour in argument and empirical study</th>
<th>Appropriateness of approach</th>
<th>Well-grounded conclusions and recommendations</th>
<th>Thoughtful discussion and interpretation</th>
<th>Relevance to this systematic review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Critical engagement with the concepts</td>
<td>Detailed, critical presentation of the warrant for the research</td>
<td>Methods and analysis fit RQ(s) and study objective(s)</td>
<td>Conclusions and recommendations clearly arising from evidence and argument presented</td>
<td>Richness of insight, including (potentially unique) understanding of the field</td>
<td>Coverage and foci of study overlap extensively with those of this review</td>
</tr>
<tr>
<td></td>
<td>Critical use of terminology</td>
<td>Strong, error-free design</td>
<td>Consistency of focus</td>
<td>Appropriate and warranted generalisations</td>
<td>Appropriate depth, reflection and criticality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Awareness of limitations</td>
<td>Alignment of analytic techniques and data collection</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

From a total of 40 eligible articles, we excluded 8 low-quality papers that obtained an overall score lower than twelve of all six criteria combined. At last 32 articles were included for synthesis. The average scores of the 32 included studies are shown in Table 2, with the lowest average score being on the “strength of conceptualization or theory” criterion.

Whilst synthesis is still underway, we have already developed and refined a coding scheme based on the research questions (see Section 1). The steps still to be taken next are: (1) grouping the extracted content into descriptive (RQ1 and RQ2) or analytical themes (RQ3, RQ4, and RQ5), (2) applying line-by-line coding to the extracted content, (3) identifying emerging themes and sub-themes by rearranging and organizing the codes, and (4) writing a report to summarise and disseminate the findings of this review.
3. Study Characteristics

A summary of the characteristics of the 32 studies included in this review is presented in Appendix 2. In terms of geographical coverage, 71 countries predominantly in Asia and Europe are covered (see Table 3 for the geographical distribution). 80% of the countries covered are high-income or upper middle-income according to the classification by The World Bank (2021).

Table 3: Geographical distribution of the included studies (N = 32)

<table>
<thead>
<tr>
<th>Africa</th>
<th>Americas N</th>
<th>Asia N</th>
<th>Europe N</th>
<th>Oceania N</th>
<th>Other N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>1</td>
<td>Ecuador, (Italy, Spain)</td>
<td>0* Bangladesh</td>
<td>1</td>
<td>13 European countries</td>
</tr>
<tr>
<td>Egypt</td>
<td>1</td>
<td>Trinidad and Tobago</td>
<td>1 India</td>
<td>1</td>
<td>Italy, Spain, (Ecuador)</td>
</tr>
<tr>
<td>Ghana</td>
<td>2</td>
<td>United States</td>
<td>1 Indonesia, Israel</td>
<td>1</td>
<td>Spain, Turkey</td>
</tr>
<tr>
<td>South Africa</td>
<td>2</td>
<td></td>
<td>1 Lebanon, China, Pakistan, Saudi Arabia, South Korea, The Philippines</td>
<td>1</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Sub-total</td>
<td>6</td>
<td>2</td>
<td>15</td>
<td>7</td>
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</tbody>
</table>

*To avoid double counting

Of the 32 studies included, 16 have a local remit (see Figure 2), and 14 only include institutions with which the authors are affiliated (see Figure 3). It is therefore unsurprising that the sample size of most studies is relatively small. Although a total of over 4,700 HE teachers participated in the 32 studies, 23 of them involve a teacher sample smaller than 100 (see Figure 4).

Figure 2: Remit of the included studies
In terms of approaches to research, 14 studies are predominantly qualitative, 10 are predominantly quantitative, and 8 are mixed methods. Surveys are the most used method (66%), followed by one-on-one interviews (47%), focus groups (16%), and other methods (16%). As articulated by a few authors in their studies, safety concerns and the mandate of social distancing during the health emergency restrict the ways in which data were collected. This is also corroborated by an overwhelming 75% of the included studies that collected data completely remotely – either online or over the phone.

**Figure 3: HE institutions being studied by the included studies**

**Institutions of study**
- Only affiliated HEIs included
- Non-affiliated HEIs included
- Unknown

**Disciplinary areas**
- Multi-discipline
- Education
- Language
- Economics/Business
- Interpretation
- Other

**Sampling strategies**
- Convenience
- Purposive
- Snowball
- Simple random
- Not applicable
- Not clear

**Figure 4: Sample size (HE teachers only) of the included studies**

**Remit of study**
- Global: 1
- Regional: 2
- National: 8
- Provincial: 5
- Local: 16

**Conceptual frameworks**
- TAM: 1
- TPACK: 2
- ORIG/NAL: 2
- OTHER: 7
- NOT/NOT CLEAR: 20

**Sample size (HE teachers only)**
- 1 - 9: 6
- 10 - 49: 15
- 50 - 99: 2
- 100 - 499: 6
- 500 - 999: 2
- 1000+: 1
The most frequently used analytical technique for qualitative data is thematic analysis, whereas many other studies do not specify the analytical technique or the method of coding qualitative data (see Figure 5). As for quantitative data, descriptive statistics such as frequencies, percentages, means, and standard deviations are most commonly used, followed by parametric tests and correlation or regression analyses (see Figure 5).

In terms of the disciplines being studied, the three most popular areas are multi-discipline (31%), education (including teacher education) (25%), and language (19%) (see Figure 6). The areas of study focus relevant to this review are mapped in Table 4. Whilst many studies investigate teachers’ technology use in ERT, the most popular topic amongst the included studies is the positive and/ or negative aspects of ERT perceived and reported by teachers. Other topics covered include teachers’ ERT experiences, teachers’ readiness for ERT, and teachers’ attitudes towards ERT. Few articles move beyond the pros-and-cons discussion of ERT (often vis-à-vis face-to-face teaching) and examine the implications of ERT for teachers and/ or the HE sectors at large. It also comes as a surprise that few included studies explore the influencing factors of technology use in the context of ERT – a much-discussed and researched topic especially in the field of information systems.

Figure 5: Data analysis of the included studies

Figure 6: Disciplinary areas of the included studies
Table 4: Included studies mapped by the major areas of focus relevant to this review

<table>
<thead>
<tr>
<th>Studies</th>
<th>Technology use by teachers</th>
<th>Teachers’ experience</th>
<th>Teachers’ readiness</th>
<th>Teachers’ attitudes</th>
<th>Factors influencing (aspects of) teachers’ technology use</th>
<th>Positive and/or negative aspects perceived by teachers</th>
<th>Other implications for teachers and/or HE sector</th>
</tr>
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<tr>
<td>Akyürek (2020)</td>
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<td>Alsadoon &amp; Turkestani (2020)</td>
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<td>Bailey &amp; Lee (2020)</td>
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<td>Callo &amp; Yazon (2020)</td>
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<td>Cutri et al. (2020)</td>
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<td>Diningrat et al. (2020)</td>
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<tr>
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<td>Said et al. (2021)</td>
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<tr>
<td>Sales et al. (2020)</td>
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<td>Scherer et al. (2021)</td>
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<td>Sobaik et al. (2020)</td>
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<td>Tang et al. (2020)</td>
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<td>Tanga et al. (2020)</td>
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<td>Tartavulea et al. (2020)</td>
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<td>Tejedor et al. (2020)</td>
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<td>Watermeyer et al. (2021)</td>
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<tr>
<td>Zeng (2020)</td>
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</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>14</strong></td>
<td><strong>9</strong></td>
<td><strong>10</strong></td>
<td><strong>11</strong></td>
<td><strong>3</strong></td>
<td><strong>21</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>
Numerous authors of the included studies recruited colleagues at their affiliated institutions during or after the COVID-19 emergency to study their colleagues’ experiences, attitudes, perceived positive and negative aspects of ERT – whilst themselves coping with changing their own practices in response to the demands of ERT. This review contributes to the literature by adopting a top-down approach to understanding these valiant but discrete research efforts in a holistic and systematic manner.

4. Preliminary Findings

4.1 Use of terminology variations

Many of the studies reviewed prioritised the rapid collection and sharing of data in a fast-changing and uncertain context over careful conceptualization and nuanced use of terminology. Table 5 shows the combinations of various terms that refer to ERT. Some of the most common combinations are “online teaching”, “online delivery”, “distance education”, and “e-learning”. These terms are as often as not used synonymously with one another in the same paper. Nonetheless, the same term used in separate studies can represent different concepts and have different connotations (see Singh and Thurman (2019) for a detailed pre-pandemic discussion in relation to this topic). For example, the term “distance education” is used interchangeably with “online teaching” in some studies, but in other instances, “distance education” encompasses teaching and learning activities conducted both online and via such venues as the radio, the television, and CDs/ DVDs. Ignoring these seemingly minor distinctions can be problematic. As an illustrative example, a teacher in a Pakistani university recorded the online lectures into CDs and sent them to students living in remote parts of the country where internet access is limited (Said et al., 2021). This solution is not “online” in the strict sense of the word, but it exemplifies how teachers in developing countries can incorporate ingenious strategies that are not necessarily “online” into their teaching, albeit during such distressing times.

Often depicted as the opposite of ERT is face-to-face teaching in physically proximate contexts. The two are usually portrayed in stark contrast to each other in the literature reviewed. For face-to-face teaching, some of the most commonly used variations are “offline learning”, “in-person teaching”, “traditional education”, and “the conventional mode of teaching” (see Table 5). We will explain why using some of these terms interchangeably can be problematic in Section 4.2. In a lot of the papers reviewed, the concept of technology is vaguely delineated and often reduced to technical artefacts and mediating tools, such as online learning platforms and other specific hardware, software, or services. As Oliver (2016) puts it, uncritical use of terminology related to technology would lead to “an inconsistent” clamour of “claim and counter-claim that simply cannot be reconciled because they do not really refer to the same thing” (2016, p.52). In essence, it is widely assumed that the above terminology variations are synonymous and hence can be safely used in an interchangeable way. Their nuanced differences are largely unexamined, or at least not adequately discussed in most of the studies reviewed.

Table 5: Commonly used combinations of terminology variations of “emergency remote teaching” and “face-to-face teaching (physically proximate)” in the included studies

<table>
<thead>
<tr>
<th>Emergency remote teaching</th>
<th>Face-to-face teaching (physically proximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>online OR digital OR distance OR virtual</td>
<td>face-to-face OR offline</td>
</tr>
<tr>
<td>OR remote OR e- OR electronic</td>
<td>OR in-person OR traditional</td>
</tr>
<tr>
<td>OR web-based OR modern</td>
<td>OR conventional</td>
</tr>
</tbody>
</table>

**AND**

- teaching OR learning OR education OR delivery OR method
- OR mode OR modality OR format OR form OR environment
4.2 Conceptualization of technology and education

Arguably, this jingle-jangle problem is the surface of a larger issue – that is, the pervasive absence of critical conceptualization of technology and education in relation to the contexts studied. Of the 32 studies, 63% do not include or specify a conceptual framework (see Figure 7), which explains the relatively low score on the conceptualization criterion (see Table 2). In particular, the contexts of technology use in education have more often than not gone unexamined. One of the most visible examples is the conflation of online teaching and ERT – the former is characterised by careful preparation and systematic planning of online courses typically in non-crisis situations, whereas the latter is a temporary resort to sustain teaching and learning during emergencies and disasters (Hodges et al., 2020). But the distinctions between these two entities are often obscure in the literature reviewed.

Interestingly, a few studies in developing countries use words like “modern” and “modernise/ modernize” when describing technology use in HE. Underlying these terms is the belief that technology is intimately linked with social development, and that technology has the potential to “modernise” education in the contexts of some developing countries. On the other hand, decontextualising terms such as “traditional education” and “the conventional mode of teaching” are used as though these terms unequivocally mean face-to-face teaching across all contexts and cultures. However, in some of the institutions being studied, the “blended learning” approach had been long-established before COVID-19 broke out (Marshalsey & Sclater, 2020; Sales et al., 2020). Thus, it cannot be safely assumed that face-to-face teaching is necessarily the predominant “traditional/ conventional teaching mode” – because the meaning of it can vary significantly across HE institutions and contexts. Likewise, the definition of technologies differs across countries and over time. For instance, the term “offline technologies” is used in one reviewed study to refer to print books and notes taken in class – artefacts that are typically not included in the definitions of other variations of the term “technologies”. This alludes to not only the vastly different understandings of technologies across cultures but also the need to account for the broader contexts when studying technology use in relation to teaching and learning.

Most of the studies reviewed have emphasised technical aspects in their definition of technology, thus largely reducing it to a list of online platforms, mediating tools, and technical artefacts. The narrow conceptualization of technology as a mere means of information delivery risks overlooking the historical contexts, cultural backgrounds, and other circumstances of technology use in education. The concept of technology is complex, deeply situated, and multi-faceted, encompassing not only technologies (or the mediating artefacts) but also the context in which teaching and learning occur.
On a related note, the discussion on how technological advancement has impacted the development in education features prominently in the introduction of numerous papers. But seldom discussed is the extent to which educational development (as shaped by agents such as teacher practitioners and researchers) may also drive technological innovation that in turn serves education purposes. For example, when the teaching practicum was removed as a result of the coronavirus spread in the UK, some teacher educators created new spaces online where student teachers, school mentors, and teacher educators themselves could meet in order to fill the pedagogical vacuum (Kidd & Murray, 2020). As the authors argue, “these new spaces, alongside the implementation of new technologies, were sources of genuine innovation” (Kidd & Murray, 2020, p.551). This example typifies an alternative conceptualization of how technology and education can be related to each other: If teachers were viewed as potential innovators of technology use in their teaching (but not reduced to the function of mere resource curators and platform selectors), there would be significant implications for recognising the original and creative efforts that teachers put into their teaching and reprioritising teaching as the core function of HE.

4.3 Tensions between practical concerns and pedagogical optimism

The studies reviewed indicate that teachers had multiple considerations regarding their teaching beliefs and methods under the new circumstances. At one end of the spectrum are teachers who have practical concerns about adapting their teaching to a different context (see Figure 8). For instance, teachers in a Chinese HE institution believe that teaching simultaneous interpretation online is undesirable (Lu, 2020). As they observe students attending class in a more relaxed and casual manner, the sense of pressure and immediacy abates in ERT when compared to previous in-class practices of real-time interpretation. Given these constraints of ERT, teachers struggle to prepare their students for mastery of the coping strategies, stress tolerance, and other essential skills required of professional interpreters (Lu, 2020).

Contrasting accounts come from teachers who exude optimism and support for using a variety of technologies in ERT (see Figure 8). They describe ERT as an impetus for a long-needed overhaul in how teaching is conceived and performed. From this standpoint, ERT epitomises an opportunity for pedagogical innovation and reflexivity as it is believed that teachers are “increasingly aware of the learning design decisions they make” (Kidd & Murray, 2020, p.552). On the wide spectrum of teachers’ perspectives, most cases reported in the literature tend to fall between the extremes of optimism and repudiation. Sometimes, when teachers stumble upon a way that helps them implement ERT, their emotional responses can change substantially from overwhelming anxiety and pessimism to relief and an eventual sense of achievement (Cutri et al., 2020).

Figure 8: Tensions between teachers' perspectives on different pedagogy-related considerations during the period of ERT

1. **Practical concerns**: Perceived limitations in available approaches and incompatibility with teaching beliefs

2. **The feeling of detachment**: Sense of joy and wonder muted; increased difficulties in bringing people together, exacerbated by the digital divide

3. **Pedagogical optimism**: Opportunities for pedagogical innovations and reflective practice

4. **The intimacy of distance**: Weird closeness of being apart but together; heightened levels of student engagement in some cases
4.4 Tensions between the feelings of detachment and intimacy at a distance

Another much-discussed aspect related to pedagogy is teacher-student engagement in the context of ERT. At one extreme, teachers feel acutely detached from their students. This can be due in part to a muted sense of joy and wonder in class as non-verbal clues are reduced or de-synchronised in the online environment (Kidd & Murray, 2020). For instance, a teacher describes how it feels like “talking to a wall” when teaching during the period of ERT (Joshi et al., 2020). As Kidd and Murray note:

Managing large groups online, with students’ screens and microphones turned off, meant that [teachers] were teaching ‘into a blank space’ making it impossible to ‘read the virtual room’ and teach interactively, using non-verbal clues from students to manage the pace and inclusiveness of the learning... In smaller groups ‘(E)mbarrassed turn-taking’ on video conferences and ‘artificial use of the chat function for questions' initially replaced interactive classroom practice. (Kidd & Murray, 2020, p.550; italics by the original )

Notably, teacher-student engagement in ERT is perceived as different, and sometimes significantly poorer, relative to face-to-face engagement prior to the pandemic.

As an aside, ERT is thought by some to undermine “yishigan” (Lu, 2020; Ren, 2020; see also Li, 2020) – a Chinese expression that describes the sense of a special, ritualised occasion of an event (which, in this case, refers to teaching). Some teachers express that teaching and learning no longer feel special given how “going to classes” becomes so convenient and effortless with just one click away (Lu, 2020). Students of art and design in an Australian institution particularly feel that their experience is affected by the disappearance of “their routine of attending university studios, workshops, in-house library resources and peer-led classes, five days a week” (Marshalsey & Sclater, 2020, p.833). The loss of “yishigan” implies that teaching and learning in some contexts may not be treated as seriously as they previously were.

Against this background, it often requires extra engagement efforts from teachers to bring together students from different physical locations and make up for the lack of presence of teachers and students in physical proximity (Tartavulea et al., 2020). One mitigation strategy used by many teachers is to ask students to show their faces on camera. Indeed, some teachers mandate the turning on of cameras during synchronous class as they consider it necessary for their subject (Ren, 2020), but others realise that this cannot be easily implemented when teaching students from a variety of backgrounds. In the context of the Middle East where Arabic female students may refuse to be seen online, teachers need to respect the differences in cultures and traditions (Hadar et al., 2020). In other cases, the problem of engagement can be compounded by the divide between those with and without the privilege of ready access to the Internet. Especially within developing countries, many local university students come from rural villages that have no access to electricity, let alone the Internet (Dampson, 2020; Khan et al., 2020; Khoza & Mpungose, 2020). In Ghana, for example, students have to travel a long distance for phone charging and internet connection (Dampson, 2020). Teachers express concern over students being unduly disadvantaged because of the restrictions that prevent them from engaging in classes offered online during the ERT period.

But this problem afflicts both teachers and students in both developed and developing countries. In the United States, some teachers frankly admit that they had no access to the Internet at home prior to the COVID-19 outbreak (Cutri et al., 2020). In developing countries like India and China, many teachers did not have the necessary teaching equipment (such as laptops, microphones, and writing boards) at home (Joshi et al., 2020; Zeng, 2020). Therefore, we cannot safely assume that all HE teachers and students have equitable access to the necessities of ERT from home in emergency times, even in the context of an affluent country like the United States.
The question teachers then have to consider is: *What can and should we do when students’ engagement and performance in class are disrupted by factors beyond their control in times of a pandemic?* Teachers may face the challenge of deciding, amongst other things, which factors their students should be held to account for and which factors that are beyond their control (Cutri et al., 2020). Compounding this is the fact that HE teachers, unlike their K-12 counterparts, usually teach larger class sizes and know little about the socio-economic status of each one of their students. As briefly mentioned in Section 4.1, a teacher in Pakistan went the extra mile by sending CDs of recorded online lectures to students living in remote areas of limited internet access (Said et al., 2021). But responses may differ depending on the contexts, which means that teachers need to exercise deliberation on the individual cases of student disengagement whilst balancing students’ needs and concerns arising from the emergency events amidst these difficult times.

In contrast, some teachers may feel somewhat more connected with their students as they perform ERT despite the paradox of intimacy of distance. Here is a case in point: in a UK university, a teacher experiences some unexpected yet palpable sense of closeness when reading the same text on a shared screen with students online during supervision (Eringfeld, 2021). Teachers also make deliberate efforts, such as introducing their pets to the class, to narrow the “distance” between students and themselves (Marshalsey & Sclater, 2020). Both teachers and students learn much more about each other in class through the cameras that show their homes and surroundings. Teacher educators, for example, express how they would not have learned about the diversity of their students’ backgrounds and childcare or domestic responsibilities without ERT (Hadar et al., 2020; Kidd & Murray, 2020) – although some feel uncomfortable with being “too close” with students alongside the blurring boundaries of the professional and private lives (Ghounane, 2020). There are also concerns about the increasing difficulty in addressing matters with students privately given the constraints of the new circumstances (Cutri et al., 2020).

With the idiosyncratic amalgam of “being together but physically apart”, it becomes axiomatic that the classroom dynamics and teacher-student relationships have been altered in the ERT period. Teachers in China, for example, are impressed with their students’ engagement via various forms of participation (such as polls, hand-raising, emojis, and voice messages), which serve to liven up the class (Gao & Zhang, 2020). Moreover, teachers observe that although students are reluctant to turn on the camera, they are often emboldened to speak or answer questions in an ERT class – something that Chinese students used not to do (Gao & Zhang, 2020). Echoing the above, other teachers in China also observe more vibrancy and liveliness in the classroom due mostly to the more active student engagement (Zeng, 2020).

With the changing dynamics of teacher-student interaction, we notice that the teacher-student hierarchy becomes less visible in many instances of ERT. In one example, teachers humbly admit their dearth of knowledge and experience in solving technical problems. It is the teachers’ demonstration of humility that prompts students to take up the role of teaching assistant and volunteer to help when the class runs into technical difficulties (Cutri et al., 2020). Likewise, other teachers believe that coping with the stress of being outside their comfort zones and areas of expertise makes ERT a unique experience that “grounded and humbled” them (Kidd & Murray, 2020). One participant in the study by Cutri et al. (2020) said, “It is humbling (in a good way) to be at a loss for words and pedagogy during a class” (p.530). To many, ERT is an experience of vulnerability and a lesson in humility. As elucidated above, the digital divide affects also teachers across many different countries (see also Said et al., 2021). As teachers become a vulnerable group, some have developed not only greater appreciation in life (Khoza & Mpungose, 2020) but also empathy and care for their students (Akyürek, 2020; Cutri et al., 2020). Students, on the other hand, express interest in receiving more emotional support from their teachers during ERT (Sobaial et al., 2020). Therefore, the affective dimensions of teaching especially during emergency times should not be overlooked.
4.5 Pedagogy-related implications for teachers

There are several pedagogy-related implications of ERT for teachers. First, the nature of the teacher-student relationship has undergone considerable changes. As explicated in Section 4.4, teachers and students interact differently given the different power dynamics between them. Students are often amused by the efforts made by teachers to be more engaging in class. Sometimes, they enjoy it when teachers use GIFs and emojis in communication (Marshalsey & Sclater, 2020, p.837). But at other times, it may be impertinent for teachers to be engaging by joking about a student's slow bandwidth in front of the class and taking it light-heartedly as though it was trivial (Cutri et al., 2020). Notwithstanding a less pronounced teacher-student hierarchy in some situations, teachers face new challenges of using technologies and interacting with students in a way that is both ethical and appropriate for the new context of teaching.

Second, the studies reviewed suggest that more emphasis has to be placed on the affective dimensions of teaching at the HE level. They argue that it is incumbent upon teachers to attend to the emotionality and well-being of their students amidst challenging times, especially those with special educational needs (Alsadoon & Turkestan, 2020; Dampson et al., 2020). One teacher educator at an Israeli college, for example, schedules meetings with students (who are pre-service teachers) late at night after the students' children are asleep. This epitomises a teacher who not only attends to students' needs but also sets a great example of care for their student teachers (Hadar et al., 2020). In Turkey, music teachers take into account the deleterious and potentially traumatising impact of COVID-19 on students and their families when planning for music lessons in ERT (Akyürek, 2020). With many students voicing their longing and appreciation for more emotional support from teachers (Sobaih et al., 2020; see also Alvarez, 2020), it becomes increasingly important for teachers to develop empathy and care for their students – a quality that is relevant both during and after the immediate outbreak of the global pandemic.

Nevertheless, the incorporation of the elements of affect and care into teaching can be harder than it seems. During the double crises of widespread racial tensions and the COVID-19 outbreak in America, teachers struggle to create a space online where the emotionality of both students and themselves can be adequately expressed (Cutri et al., 2020). Embracing self-care is also crucial when teaching under traumatic conditions. Beyond the complexities of an unexpected transition to ERT, teachers face an interlinked set of concerns and issues in the broader contexts of the pandemic, including but not limited to safety and well-being of themselves and their families, food availability, connection with colleagues and students, and their academic career development, including job stability and employment prospects (Cutri et al., 2020; Kidd & Murray, 2020). Whilst the literature reviewed suggests that HE teachers need more training on technological and pedagogical skills in the future, we argue that incorporating the affective, care and self-care aspects into teaching is of tantamount importance as the pandemic continues to take its toll on HE systems around the world. The digital divide besets both the developed and developing countries, and equitable access to the necessities of ERT cannot be tacitly taken for granted.

5. Limitations

Due to the global remit of this systematic review, we foresee challenges in integrating findings grounded in different HE contexts. Besides, the variations of terms used by different authors (as explicated in Section 4.1) can lead to gaps in cross-context synthesis. To mitigate these limitations, we have extracted the details pertinent to the contexts of both the countries and HE institutions (if known) studied from each paper. These pieces of information will be taken into account in the subsequent synthesis stage. When reporting the findings, the relevant contexts are also presented.

Another limitation is that this review only includes journal articles of original empirical research studies published in 2020. Hence, insights from other publication types (such as the pieces written by teacher practitioners that inquire their ERT experience introspectively) are not reflected in this review. Since the review work is still underway at the time of writing, the findings presented in this paper are preliminary, including only the pedagogy-related implications of ERT for HE teachers without addressing the broader contexts of academia.
6. Conclusion

This paper adumbrates the preliminary contours of the findings in our review of relevant literature on technology use in the context of ERT from HE teachers’ perspectives. Since many included studies take place in the authors’ affiliated institutions and have a local remit, this systematic review contributes to the literature by integrating and consolidating these scattered research efforts in a systematic way. To recapitulate, we maintain that the use of terminology variations (such as “online teaching” and “distance education”) should be more nuanced and critically examined. Future research is also recommended to take stock of the relationship between technology and education as the teacher-student relationship is reconfigured in the new spatiality and temporality of virtual interactions. Teachers can be viewed not as mere curators of various technical artefacts, but alternatively as agents who ingeniously innovate strategies that engage their students in a way suitable to the new contexts of teaching and learning, or co-create solutions with other teachers and with the students. It is imperative for research to investigate how technology comes into play in rebalancing power in the teacher-student relationship and potentially fostering the interactions between teachers and students, in situations of crisis and beyond. In addition, researchers should be cognisant of the oft-overlooked affective domain of teaching at the HE level when conducting future research. As the pandemic continues to wreak havoc around the world, more research is needed to provide practical solutions to guide the incorporation of the elements of affect and care into teaching (and to create the structural and working conditions that enable teachers to do so) so that teachers can attend closely to the emotional needs and well-being of their students, while exercising self-care, amidst these trying times of the pandemic.

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Contributions

The corresponding author performed all stages of the project under the supervision of the second author. (Note that synthesis is still in progress at the time of writing.) Both authors independently coded and analysed a selection of data excerpts at various stages to check for inter-rater reliability. Communications between the authors are maintained throughout the research process. This manuscript was drafted by the corresponding author and revised by the second author. Both authors approved the final version for submission.
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*Full search terms for English databases (Scopus, Web of Science, EBSCO, and Dimensions.ai) and condensed search terms for Google Scholar are not displayed (due to space constraints), but will be available upon request.*
## Appendix 2 – Summary of study characteristics

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*The references of four articles show the publication year of 2021. These four articles were published online ahead of print in 2020 and hence are included in this study.*
Immersion in the Early Years: The future of education and children’s key to success

Faidra Faitaki¹, Kate Nation² & Victoria A. Murphy¹

Abstract

Linguistic skills at the end of preschool are important known predictors of academic attainment throughout schooling. Moreover, research has shown that introducing children to a second language can serve as a means of improving children’s linguistic skills. This practice is implemented in Greece, where children can attend ‘submersion’ preschools, where the curriculum is delivered in English, or ‘immersion’ preschools, where the curriculum combines the two languages such that some classes are in Greek and some in English. Nevertheless, little is known about the linguistic outcomes of the children who attend these programs and, thus, about the programs’ efficacy. The data reported in this paper stems from a (larger) study that involved 140 preschool children between the ages of 4;10 and 5;11 (35 in submersion and 35 in immersion, alongside 34 Greek monolingual and 36 English monolingual controls). The children participated in various tasks that included two standardized tests assessing their vocabulary and grammar in both Greek and English. Statistical analyses revealed that Greek-English emergent bilingual preschoolers received comparable scores on the vocabulary tests and higher scores on the grammar tests relative to their Greek monolingual peers. Notably, the immersion group outperformed the Greek monolingual group in all proficiency measures. These findings highlight that learning a second language at preschool does not hinder children’s linguistic development; rather, it benefits their first language skills, especially when the children’s two languages are equally supported. The findings suggest that English-medium programs, which are proliferating around the world, can give children the chance to achieve better linguistic outcomes and, by extension, greater academic success.

Keywords

Immersion; early years education; bilingualism; linguistic outcomes; educational attainment

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Introduction

Language underpins all aspects of education. To succeed in school, children must have substantial knowledge of spoken and conversational language as well as academic language (that is, the language used in the classroom). Both registers have unique lexical and grammatical features that children have to learn (Whiteside, Gooch & Norbury, 2017), and children who have stronger language at the start of schooling achieve better academic outcomes throughout education and at its completion (Demie & Strand, 2006; Muter, Hulme, Snowling & Stevenson, 2004; Strand, Malmberg & Hall, 2015).

It follows that supporting multilingual children’s linguistic development at the first stages of education, referred to as the Early Childhood Education and Care (ECEC), is crucial for improving children’s academic attainment. This practice also allows the cognitive, social, and linguistic benefits of bilingualism to be harnessed (Byers-Heinlein & Lew-Williams, 2013; Genesee, 2009; Murphy, 2014). Crucially, these benefits only manifest in contexts that allow the children’s languages –whether these belong in the minority or the majority of the society– to grow in tandem (Murphy, 2018).

Unfortunately, this is not the case across the board; many educational structures fail to successfully integrate different languages, and the pupils that speak them, in their ECEC provision (see Murphy & Evangelou, 2016 and references therein). The situation is aggravated in countries where English is the majority language, like the UK; in these countries, children who speak a minority language at home and learn English as an Additional Language (EAL) at school do not always receive the linguistic support they need and as a consequence, they are at risk of both linguistic and academic failure (Faitaki, Hessel & Murphy, 2020; Murphy, 2014; Strand & Hessel, 2018)1.

There have been attempts to narrow the linguistic and academic gap between EAL and monolingual pupils, for instance through language and literacy interventions (for systematic reviews on the topic, see Murphy & Unthiah, 2015; Oxley & De Cat, 2019). Another way for EAL learners to catch up with their monolingual peers is through attending an immersion program. The benefits of immersion programs have been highlighted in various empirical studies (e.g., Hermanto, Moreno & Bialystok, 2012; Lindholm-Leary & Block, 2010; Marian, Shook & Schroeder, 2013) and research reports (e.g., Genesee, Lindholm-Leary, Saunders & Christian, 2006; Reljić, Ferring & Martin, 2015; Rolstad, Mahoney & Glass, 2005). These investigations suggest that immersion programs confer academic gains and give pupils a chance to develop their second language (L2) whilst maintaining their skills in their first language (L1).

Thus, immersion programs can be effective in developing the L2 skills of children who speak a minority language at home. This observation was highlighted in Lindholm-Leary and Block’s (2010) studies, which involved 659 L1 Spanish students who attended a Spanish-English bilingual program (N=297) or an English monolingual program (N=362) in the US. Students completed language and maths tests in both English and Spanish and the authors found that children who attended the bilingual program scored the same or higher than the children who attended the monolingual program in the English version of the tests. Moreover, they also performed at grade level in the Spanish version of the tests.

The benefits of immersion tend to be more pronounced in programs that provide support, time, and resources for the development of both L1 and L2. Marian et al. (2013) examined the differential effect of monolingual and bilingual immersion programs on the language and maths scores of 2007 pupils in Grades 3-5 in the US (of whom 159 were EAL learners and 1852 were L1 English speakers). EAL learners’ test results increased substantially from Grade 3 to Grade 5, but the increase in scores was reserved for the EAL learners who attended the bilingual program. In contrast, the scores of the EAL learners who attended the monolingual program did not change much between the two grades. In fact, at Grade 5, the bilingually educated learners outperformed their monolingually-educated peers in maths. These findings are not limited to the US; focusing on studies that were carried out in Europe, a meta-analysis by Reljić et al (2015) reported that children in monolingual immersion experience smaller linguistic and academic gains relative to children in bilingual immersion.
In addition to developing L2 proficiency, there is evidence that immersion programs also maintain or strengthen children’s abilities in their L1. For example, Hermanto et al (2012) conducted a cross-sectional investigation of 83 L1 English students (50 in Grade 2 and 38 in Grade 5) attending a French monolingual immersion program in Canada, and reported a considerable increase in children’s English vocabulary and grammar scores from Grade 2 to Grade 5. Moreover, by Grade 5, the bilinguals outperformed the monolinguals in terms of lexical and grammatical proficiency in English (i.e., their L1). Thus, the authors argued that attending a (monolingual) immersion program focusing on L2 has the potential to accelerate children’s linguistic development in the L1.

Under this light, investigating the effects of monolingual and/or bilingual immersion on children’s linguistic outcomes in the L1 and the L2 appears to be of merit. This endeavor would be particularly worthwhile at present, as the number of institutions around the world that adopt immersion programs is increasing, while the age at which immersion programs commence is decreasing (OECD, 2014). Driven by the belief that ‘the younger the language learner, the better the language learning’, many countries have adapted their national policies to include L2 tuition in their ECEC provision in order to introduce children to an L2 as early as possible (Genesee, 2016; Murphy & Evangelou, 2016; Rixon, 2013). The belief that ‘the younger, the better’ is particularly widespread in Europe. Indeed, the European Council set its members the objective to introduce children to at least two L2s from a young age during its 2002 meeting in Barcelona (Eurydice, 2017) and, as a result, numerous European countries now include L2 lessons in their ECEC provision. In fact, in countries whose ECEC provision does not include L2 lessons, parents often decide to take matters into their own hands and expose their children to an L2 through private tuition (Enever, 2011; Rixon, 2013).

One of the countries where this phenomenon occurs at a ‘manic’ level is Greece; Greek private institutions are entitled to circumvent the national curriculum (which does not include language learning), and to incorporate L2 lessons in their ECEC provision (Dendrinos, Zouganeli & Karavas, 2013). As a result, the Greek educational context comprises monolingual immersion (or ‘submersion’) programs, and bilingual immersion (or ‘immersion’) programs. In the former, teachers who have English as their L1 deliver the British National Curriculum (or its American equivalent) in English. In the latter, teachers who have English and/or Greek as their L1 deliver a custom curriculum, such that some activities are run in Greek and some in English.

As such, children in submersion preschools receive all their school input (amounting to around 30 hours per week) in English whereas children in immersion preschools receive half of their school input (around 15 hours per week) in English. Moreover, while children in submersion only hear Greek at home, children in immersion are also exposed to the language at school. The differences in the amount of English and/or Greek input that the children who attend these programs receive are likely to affect their linguistic outcomes in either language (e.g., De Cat, 2020; Hoff, Core, Place, Rumiche, Señor & Parra, 2012; Thordardottir, 2011).

However, most of the studies on the effects of submersion and immersion programs focus older learners. Indeed, the number of studies that explore the L1 and L2 outcomes of submersion- and immersion-educated preschool children (especially in the Greek context) is small (Hickey & De Mejía, 2014; Reljić, et al., 2015). Exploring the linguistic attainment of the children who attend these programs from preschool onwards would be worthwhile from a theoretical and a practical perspective: on the one hand, it can shed light on the processes that underpin their acquisition; on the other hand, it can contribute to the design of curricula and resources that have the potential to maximize children’s language learning. Undertaking this exploration was the goal of the present study2, which addressed the following Research Questions (RQs):

1. How does bilingual children’s lexical and grammatical proficiency compare to that of English and Greek monolingual peers?
2. Are there differences in the L1 and/or the L2 linguistic outcomes of submersion-educated and immersion-educated children?

We predicted that the English-Greek emergent bilingual preschool children would achieve lower scores in English vocabulary and grammar than their English monolingual counterparts, but comparable (or higher) scores relative to their Greek monolingual counterparts. Moreover, submersion-educated children were expected to outperform their immersion-educated peers in terms of their lexical and grammatical proficiency in L2, while the latter were expected to outperform the former in terms of lexical and grammatical proficiency in L1.
Methods

A total of 140 children between the ages of 4;10 and 5;11 who met the inclusion criteria took part in the study. Of these, 70 were English-Greek bilingual, 36 were English monolingual and 34 were Greek monolingual. The bilingual group was further divided into two sub-groups: the ‘submersion’ group (N=35), and the ‘immersion’ group (N=35). The participants were recruited through their schools, using stratified random sampling (Rose, McKinley & Briggs Baffoe-Djan, 2020). To be included in the sample, monolingual children had to be between the ages of 4;0 and 6;0, and to fit in one of the monolingual groups (English or Greek). Bilingual children had to fall within the same age range, have Greek as their only L1, speak Greek at home, and be learning English through school. Since bilingual children’s exposure to English was limited to the school context, the age at which they joined the preschool (i.e., from 3;0) was also when their L2 acquisition began.

Instruments

The children completed two standardized tests that measured their receptive lexical and grammatical knowledge in English and Greek (among other measures). The motivation behind assessing children’s understanding of words was the fact that receptive vocabulary knowledge is known to be a good indicator of proficiency (e.g., Miralpeix & Muñoz, 2018). The decision to measure children’s comprehension of grammatical constructions was driven by an interest in obtaining a holistic estimate of children’s proficiency so as to answer our RQs.

The British Picture Vocabulary Scales (BPVS-3; Dunn, Dunn, Styles & Sewell, 2009) was used to measure children’s receptive vocabulary in English. This test uses a multiple-choice format: the assessor says a word, and the child is asked to select one of four pictures that illustrates the meaning of the word. The test consists of 168 words, organized in 14 sets of increasing difficulty. Depending on their age, children start from a specific set, and complete as many sets as possible until the termination of the procedure or the end of the test. For the procedure to be terminated, the participants should make eight (or more) mistakes in one set.

Children’s vocabulary in Greek was measured using the Greek edition of the Peabody Picture Vocabulary Test - Revised (PPVT-R Greek; Simos, Sideridis, Protopapas & Mouzaki, 2011). This uses the same multiple-choice format as the BPVS3. The Greek edition consists of 173 items, which are not divided into sets: instead, the test commences from a ‘starting’ item based on children’s age and proceeds until the child makes six mistakes in a sequence of eight consecutive items.

The Test for the Reception of Grammar (TROG2; Bishop, 2003) was used to measure children’s receptive grammar in English. This consists of 80 test items, arranged in 20 blocks of four, with each block assessing children’s understanding of a specific grammatical construction four times. It also uses a multiple-choice format: each item is presented alongside four pictures, and children are asked to choose the picture that illustrates the item. Participants start from the test’s first item, and complete as many blocks as possible until the test comes to an end, unless the procedure is terminated prematurely; this happens if participants are unable to correctly identify all the items in four consecutive blocks.

Children’s receptive grammar in Greek was measured using the ‘Comprehension of Morphosyntax’ subtest of the Diagnostic Verbal Intelligence Quotient (DVIQ; Stavrakaki & Tsimpli, 2000). This subtest also makes use of a multiple-choice format, and consists of 31 items that represent various grammatical constructions. The administration of the subtest commences from the test’s first item and proceeds until the last item, regardless of the children’s age or performance in the test.

Procedure

Prior to data collection, parents provided informed consent. Children were also asked whether they assented to taking part in the study. Then, the protocol was administered in both languages for bilingual children, while the monolingual children completed the tests in their respective L1s. The instructions for the tests were always provided in the children’s L1 (i.e., English for the English monolinguals, and Greek for the Greek monolinguals and the bilinguals) to ensure children’s understanding. Since bilingual children had to complete the tests in two languages, the Greek assessment was administered first so as to allow children to accumulate more exposure to English; then, the English assessment followed (at least) two months later.
The (English and Greek) monolingual children were tested in an unused classroom in their schools. The bilingual children were tested in a spare room in their schools for the Greek assessment, while the English assessment took place online, using the schools' virtual learning platforms, as COVID-19 restrictions made visiting the schools in person impossible at the time of testing. During face-to-face administration, the experimenter was alone with the child whereas during the online administration of the English assessment in the bilingual groups, a teacher was present for safeguarding purposes and to help with technical issues. When present, teachers did not interfere with the procedure.

The administration time for the BPVS3 and the TROG2 was 15-20 minutes (depending on children's performance). The PPVT-R Greek took 10 minutes to complete and the ‘Comprehension of Morphosyntax’ subtest of the DVIQ 5 minutes. At the end of the procedure, children received a certificate of completion for their participation.

**Main Text (Results)**

Following data collection, the tests were scored. The process of scoring involved the calculation of a raw score for each child. Raw scores were used, motivated by the fact that none of the tests that were used in the study have been standardized for bilinguals, making the use of standard scores inappropriate. To calculate the raw scores, the number of mistakes a child made was subtracted from the total number of items he/she completed. After the scores were calculated, statistical analyses were performed to compare the bilingual children with their monolingual counterparts in the Greek and the English assessment.

**English Assessment**

As shown in Figure 1, the English monolingual children outperformed the English-Greek bilingual children in vocabulary. A One-Way ANOVA with children’s raw scores as the Dependent Variable and Language Group as the Independent Variable was significant, and corresponded to a very large effect: $F(2,103)=53.31$, $p<.001$, $\eta^2_p=.51$. A series of Dunnett’s T3 post-hoc tests revealed that these effects stemmed from differences between all three groups. English monolingual children performed significantly better than children in submersion (mean difference=19.19; $p<.001$) as well as than children in immersion (mean difference=37.42; $p<.001$). Moreover, children in submersion performed significantly better than children in immersion (mean difference=18.23; $p<.001$).

![Mean BPVS3 Score per Language Group](image)

*Figure 1: Bilingual and Monolingual Children’s English Vocabulary Scores with Standard Error (SE).*
The same patterns were observed for receptive grammar, as shown in the TROG2 data plotted in Figure 2. A One-Way ANOVA revealed that the difference between the groups was significant and represented a very large effect: $F(2,103)=127.74$, $p<.001$. $\eta^2_p = .71$. The Dunnett T3 post-hoc tests that were subsequently carried out revealed that the mean difference between the English group and the submersion group, 25.94, and between the English group and the immersion group, 35.62, were both significant ($p<.001$). Moreover, the difference between the submersion group and the immersion group, 9.69, was also significant ($p<.001$).

![Mean TROG2 Score per Language Group](image)

**Figure 2: Bilingual and Monolingual Children’s English Grammar Scores with SE.**

**Greek Assessment**

As illustrated in Figure 3, the performance of the groups in the Greek assessment was more varied. The three groups’ performance on the test was compared using a One-Way ANOVA with the PPVT-R Greek raw scores as the DV and the Language Group as the IV. The ANOVA was significant and represented a large effect: $F(2,101)=28.95$, $p<.001$, $\eta^2_p = .36$. To identify the locus of the observed effects, a series of Tukey HSD post-hoc tests were conducted. These revealed that the immersion group outperformed both the Greek group and the submersion group. The mean difference between immersion children and Greek monolingual children, 6.03, was not significant: $p=.212$. Yet, the mean difference between immersion and submersion children, 25.43, was highly significant: $p<.001$. Submersion children also differed from Greek monolinguals (mean difference=$-19.40$; $p<.001$).
The picture was equally varied with regards to the DVIQ data, pictured in Figure 4. In this case, the One-Way ANOVA with DVIQ raw scores as the DV and Language Group as the grouping factor indicated a significant difference between the groups, that corresponded to a medium effect: F(2, 101)=3.59, p=.030, η² = .06. The Tukey HSD post-hoc tests suggested that, once again, children in immersion performed better than their peers in the other two groups. This time, the mean difference between the immersion group and the Greek group, 2.01, was significant: p=.029. However, the mean difference between the immersion group and the submersion group, 1.26, was not (p=.218). In addition, submersion children did not differ significantly from Greek monolinguals (mean difference=.75; p=.576).
Discussion

The results can provide answers to the study’s RQs. The first RQ explored how does the bilingual children’s lexical and grammatical proficiency compare to that of their English and Greek monolingual peers. In sum, the statistical analyses did reveal differences in the lexical and grammatical proficiency of the bilingual groups and the respective monolingual groups in each of the assessments. The second RQ asked whether there are differences in the L1 and/or the L2 linguistic outcomes of submersion-educated and immersion-educated children. The analyses revealed that the two bilingual groups did not perform alike in the two assessments. In the English assessment, children performed in a gradient according to the input they received in the L2, confirming our initial predictions. In particular, the monolingual group outperformed both bilingual groups, while the submersion group (whose members receive all their school input in English) scored higher than the immersion group (whose members receive half of their school input in English). The results of the Greek assessment were mixed, but also in line with our predictions: the immersion group outperformed the monolingual group as well as the submersion group with regards to both proficiency measures; in this case, the monolingual group achieved higher scores than the submersion group in the vocabulary test, but the latter achieved higher scores than the former in the grammar test.

The results suggest that the amount of input children receive in their L1 and/or the L2 shapes the linguistic outcomes they attain in each language. This finding has been reported in numerous studies, all of which suggest that linguistic exposure is critical in determining bilingual children’s lexical and grammatical proficiency in the L1 and the L2 (e.g., De Cat, 2020; Hoff, et al., 2012; Thordardottir, 2011). The effect of input on linguistic attainment should be kept in mind during the design and implementation of submersion and immersion programs, which might lead to different linguistic outcomes in the L1 and the L2 for their pupils, due to the varied amounts of linguistic exposure they provide.

Indeed, with respect to L2 outcomes, the present study hints that children in submersion might have an (initial) advantage. These findings are reminiscent of Marian et al (2013) who reported higher gains in L2 language skills for submersion-educated EAL learners relative to immersion-educated EAL learners in Grade 3; they also noted that submersion-educated participants did not maintain their gains across time and, by Grade 5, were outperformed by the immersion-educated participants. Given the fact that our study is not cross-sectional or longitudinal, it is impossible to determine whether submersion-educated children will continue to surpass their immersion-educated peers in terms of L2 lexical and grammatical proficiency. Future research should examine the linguistic outcomes of the two groups at multiple timepoints to assess if the observed effects persist or change over time.

Turning to L1 outcomes, the data point towards an advantage for children in immersion. This finding is in line with previous research, where immersion-educated children tend to attain higher lexical and grammatical proficiency in their L1 relative to their submersion-educated peers, and to match or surpass their monolingual peers (for a comprehensive review, see Genesee et al., 2006). As such, the present study confirms and extends previous research. While most studies on the benefits of immersion on L1 outcomes has focused on older children (i.e., attending primary-school), our data concern younger children and indicate that the benefits of immersion on L1 outcomes appear from an earlier age than formerly examined.

This observation is important given the fact that children’s early L1 abilities are precursors of later L1 abilities. For instance, Muter et al (2004) followed a group of 90 L1 English children for two years from the time they started school (mean age: 4;9). The authors measured children’s development in various skills, including vocabulary and grammar, and reported that lexical and grammatical knowledge at the start of schooling were both strong predictors of children’s subsequent reading skills.

In addition, language skills at the first year of schooling are known precursors of academic attainment at the end of primary school (e.g., Strand & Demie, 2005) as well as at the end of secondary school (e.g., Demie & Strand, 2006). The importance of early language skills is underscored in the case of children whose home language is in the minority relative to the societal language, such as EAL learners. For instance, Strand et al’s (2015) analysis of the data in the UK’s National Pupil Database revealed that fluency in English was the most important predictor of EAL learners’ achievement in reading and maths, such that children with high levels of proficiency in English also receive better scores in both subjects (cf. Strand. & Hessel, 2018). Thus, if minority language learners are to catch up with their monolingual peers in terms of academic achievement, their skills in the L2 (in this case, English) should be assessed at the start of school and monitored throughout.
Given the positive effects of submersion and immersion on children's L2 proficiency, it can be argued that these educational programs can be used as the tools to improve their educational outcomes. This was evidenced in various studies cited throughout this paper but, also, in Murphy, Macaro, Alba and Cipolla's (2016) intervention. The authors divided 150 English monolingual children between the ages of 7;0 and 9;0 into three groups: the first received French lessons, the second received Italian lessons and the third served as the control which received no L2 tuition. At the end of the intervention the two groups who received L2 tuition experienced an increase in their L1 literacy skills (assessed through measures of reading accuracy and phonological awareness). By contrast, the control group's performance did not change. The results of Murphy et al's (2016) study suggest that using L2 lessons as a tool for improving children's L1 skills is a feasible and useful endeavor.

This line of research shows promise: it is known that the two languages in a bilingual's brain are linked, such that knowledge acquired in one language can be extrapolated to the other language (Cummins, 2000; Lindholm-Leary, 2001). Thus, contrary to parents' and educators' fears, learning an L2 at preschool does not hinder children's linguistic development in their L1; rather, it promotes it (Byers-Heinlein & Lew-Williams, 2013; Genesee, 2009). This idea is illustrated in our study, as English-Greek emergent bilingual children (whether in submersion or in immersion) were not found to differ substantially from Greek monolingual children in terms of L1 skills. In fact, there was but one (statistically) significant deviation from monolingual norms in the data, as submersion-educated children scored lower than their Greek monolingual peers in the grammar test. This deviation can be explained by the fact that submersion-educated children receive less input in their L1. Therefore, it is expected that their grammatical proficiency will develop over time as their cumulative exposure (to sufficient and rich linguistic input) increases (De Cat, 2020; Hoff, Quinn & Giguere, 2018; Unsworth, 2013).

Conclusion

The study presented in this paper aimed to explore the linguistic attainment of the children who attend monolingual or bilingual immersion programs at preschool. The results of the study suggest that both programs can be considered as effective routes to bilingualism as they allow children to acquire an L2 and, in the case of bilingual immersion, to also improve their knowledge of their own L1 (Hermanto et al., 2012). Indeed, according to the results, providing instruction in both of bilingual children's languages (e.g., through bilingual immersion programs), appears to support their holistic L1 development.

However, introducing languages in ECEC is not a mean feat: schools need to devote substantial time and effort to make it possible (Hickey & De Mejía, 2014; Hopp, Jakisch, Sturm, Becker & Thoma, 2020; Murphy & Evangelou, 2016). As Murphy and Evangelou (2016) note, the benefits of language learning at ECEC can only be experienced in contexts that encompass well-trained teachers, sufficient resources and well-devised curricula. Yet, monolingual and bilingual immersion programs are often designed and delivered in a rushed and unstructured fashion, in an effort to deal with parental pressure (Rixon, 2013); such programs are unlikely to be beneficial and might even be harmful to the learners’ linguistic development and academic potential. This is an important point for the incorporation of L2 tuition in ECEC, and a pertinent one in light of the increase in the global uptake of immersion education (OECD, 2014).

Moreover, despite the benefits of immersion programs that were highlighted in this paper (and in numerous papers before it), the introduction of languages in ECEC is not panacea: while the introduction of an L2 in a school's ECEC curriculum might lead to improvements children's L1 skills, which might result in an increase in their academic attainment, it is unlikely that the introduction of an L2 can change children's outcomes in and of itself. To achieve this goal, coordinated efforts from all stakeholders involved in immersion education (i.e., teachers, parents, policymakers, as well as pupils themselves) would be required.

This argument is of particular relevance in the case of minority-language pupils, including EAL learners in the UK, who tend to lag behind their monolingual peers in terms of attainment. Efforts to close the gap between EAL learners and their monolingual peers would have to involve a macro-level change in mentality, such that multilingualism could be embraced and integrated and in the national ECEC provision. In turn, this change could promote language learning and give children the key to academic success.
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Ethical Statement

The research project was approved by the Central University Research Ethics Committee of the University of Oxford and adheres to the British Educational Research Association Ethical Guidelines for Educational Research.
References


Introducing the relational change laboratory: An innovation in doctoral education

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Abstract
The narrative of an evolution in doctoral training is prevalent within higher education, with politically and socially driven calls to prepare future researchers for career mobility. Arguably, the range of practices that researchers need to engage with are various. Many for example cross disciplinary, cultural, geographic and institutional boundaries into other practice domains to pursue opportunities for knowledge exchange, impact and grant generation. What is less clear is the form of expertise that student researchers need to develop in order to traverse such a complex landscape and how that expertise might be developed within the confines of a traditional doctorate.

This paper seeks to contribute to the discussion by introducing a new form of pedagogy designed to connect doctoral researchers with non-academic organizations to resolve real-world problems. This new approach to doctoral education pedagogy builds on the methodology of the Change Laboratory (Engeström, 1987) and the concept of relational working (Edwards 2017), specifically the sub-construct of relational expertise. The intention of the empirical study was to stimulate relational working by connecting practices that would not normally come together - opening up new opportunities to engage students from a range of disciplines.

The intervention brought together doctoral students from a research-intensive University and non-academic professionals from a national charity in the UK. It comprised an eight-month relational form of Change Laboratory (a Relational Change Laboratory) that involved 26 participants: 9 doctoral students from the University; 11 professionals from the charity, and 6 additional professionals from related organizations. The findings draw on data from the nine sessions of the intervention, tracing the model of this innovative form of experiential learning with a focus on doctoral students studying humanities subjects, which is an often overlooked domain (Thune, 2009). The research question considered the extent to which relational expertise - the capacity of participants to work relationally with others on a complex problem - developed during the empirical study. Multiple sources of data were analyzed including observing the language and behaviors of participants through audio and video recordings of the sessions, the artefacts produced during the intervention, and two focus groups to clarify the initial findings.

The findings suggest that this form of pedagogy offers a new approach to doctoral education that supports students to develop the distinct form of relational expertise needed to engage across boundaries. The students’ expertise developed from the individual to the relational as their research interests and expertise became objectified, this manifested in externally observable tools that expanded the problem object. Notably, the design of the Relational Change Laboratory enabled the development of relational expertise to be traced and recorded, which was critical for those students whose domain of expertise was considered tangential to the real-world problem and where relational expertise manifested as dialogic rather than tangible in nature.

Keywords
Immersion; early years education; bilingualism; linguistic outcomes; educational attainment
Introduction: Conceptions of doctoral education

From its roots as a rarely studied apprenticeship in scholarship and research, the PhD has evolved to become an increasingly sought-after qualification that prepares students for a range of future careers (Chigisheva et al., 2017). Recent developments include a rapid rise in the number of doctoral students, the introduction of new forms of doctoral qualifications and political demands for researchers to impact society (Chigisheva et al., 2017; De Jager et al., 2017). As a consequence, the traditional research apprenticeship model no longer holds sway and the design of doctoral education is evolving at pace (Smith, 2010).

A degree of consensus is apparent in the scholarship regarding the need to prepare doctoral researchers for future career mobility (Bienkowska & Klofsten, 2012; Hopwood & McAlpine, 2015; Shulman et al., 2006). Proponents of change argue that the career trajectory of doctoral students has already irrevocably altered, leading to significant shifts in postdoctoral students’ employment patterns and non-linear career pathways within and beyond academia (Coates & Goedegebuure, 2010; Strike, 2010; Whitchurch & Gordon, 2013).

Despite the consensus for change there remains unresolved tensions, particularly in terms of the purpose and content of doctoral education (Hasted, 2019). Calls for change based on the employability narrative are countered by resistance to altering the delivery of a traditional doctorate in response to economic demands and policy directives. Critics of the economic discourse denigrate training provision based on employability skills as ‘reductive’ (Craswell 2007, p.377) and unsympathetic to the ‘complexity and richness of the doctoral learning experience’ (Golovushkina & Milligan 2013, p.195). The current, politically driven focus on generic skills is particularly interrogated (Gilbert et al., 2004; Hinchcliffe et al., 2007). Detractors urge caution, arguing that a reflex response to changes in policy direction runs the risk of designing a narrowly defined, economically driven doctoral apprenticeship. Scholars particularly challenge the emphasis on developing an atomized skill set and call for the development of a more nuanced performance-based approach to preparing students for future mobility (Cumming, 2010; Sfard, 1998).

This trend towards performance is a dominant theme in the higher education literature. Within the field of doctoral education this manifests as a critical appraisal of programs that lack opportunities to perform and translate the value of the PhD beyond the confines of students’ field of study to new contexts (Cryer, 1998; Kelly, 2016; Samuel, 2016). Another key strand of this discourse is a critique of the notion of acquisition - the development of specific skills that students must master - compared with the more progressive notion of contextualized performance that encourages experience from practice, with students supported to enact capabilities in both new and unfamiliar settings within and outside the academic context (Bienkowska & Klofsten 2011; Engeström & Sannino, 2010).

Despite the rhetoric of the need for an expansion of doctoral education beyond a prescribed purely academic curriculum, there are few empirical studies that have investigated the involvement of a broader range of participants in such an exchange (Salimi et al., 2016). Those attempts that have been made commonly concentrate on internal voices within universities, including PhD students, supervisors and researcher developers rather than those they need to engage with beyond the academic boundary (Armsby et al., 2017).

At this point in the review of the literature, it is therefore helpful to consider alternate conceptions of what it means to become an expert researcher, adept in this new landscape of career mobility and societal impact. An important consideration is the role of knowledge within that frame and the argument that becoming an expert requires more than just extending the depth of knowledge within a disciplinary field of expertise (Nowotny et al., 2001). In the context of doctoral education, this suggests that an additional, horizontal connection of knowledge is required that relates what students know with others (Nowotny et al., 2003).

A new tranche of research builds on this notion of horizontal movement of knowledge and expertise that is particularly relevant to the context of this study. Edwards’ lens of enquiry focuses on the relational aspects of collaboration and the development of a distinct capacity - that of relational working – with the potential to prepare researchers for a relational future (Edwards, 2017). In essence, Edwards challenges that rather than just moving context, successful collaboration occurs through ‘task-focused’ work ‘at sites of intersecting practices’ (Edwards, 2017, p. 7). The theory has been applied in studies across a diverse range of contexts such as children’s services and interprofessional collaboration within the health service. Although relational working is relatively new to studies in the field of higher education, it presents an interesting phenomenon to explore in the context of doctoral education (Hasted & Bligh, 2019).
Relational Working Theory

Relational working theory comprises the three concepts of common knowledge, relational expertise and relational agency that Edwards presents as the tools necessary to ‘build, nurture and sustain the expertise needed for collaboration across practice boundaries’ (Edwards, 2017, p. 8).

Although mindful of the interrelated nature of the three concepts, this paper concentrates on Edwards’ theory of relational expertise. Edwards defines relational expertise as,

A capacity to work relationally with others on complex problems. Crucially, it involves the joint interpretation of the problem as well as the joint response. The object of activity needs to be collectively expanded to reveal as much of the complexity as possible. (Edwards, 2017, p. 8.)

Edwards describes relational expertise as a distinct capability and one that requires, in the context of doctoral education, a supplementary layer of expertise beyond domain-based knowledge. A careful exegesis of Edword’s source materials allows for deeper insights into the distinct features of relational expertise. Each italicized term quotes indirectly from Edwards’ work, particularly Edwards, 2017, pp. 8 and 9, with the definition expanded on by the extended reading of her texts.

- **Capacity to interconnect expertise.** This denotes fluency in the ability to relate the expertise of oneself and others to a complex problem, including recognizing the appropriateness of those different forms of expertise to address the problem.
- **Capacity to recognize motives.** This requires the ability to relate the motives and values of practitioners from other practices to a complex problem.
- **Capacity to align motives mutually.** This indicates an ability to align with the motives of other practitioners in order to jointly respond to a complex problem.

It can be seen that underlying each of the three features of relational expertise is the notion of a shared complex problem. Edwards & Stamou (2017, p. 309) discuss this aspect of relational working arguing that interactions require a stimulus, a process that they describe as ‘levelling’ and one that attends to engaging other participants. Notably, the significance of a shared problem - described in this paper as a ‘problem object’ held in common with participants - is also cited in the broader scholarship on boundary crossing interventions (Kinti & Hayward, 2013; Sang, 2017; Simpson & Sommer, 2016).

The intention of this empirical study is to stimulate a live collaboration between doctoral student practitioners and non-academic professional practitioners. The research question considers to what extent relational expertise, the capacity of participants to work relationally with others on a complex problem, is developed during the research intervention.

The research design and methodology

The methodological approach adopted for the study is based on the Change Laboratory (Engeström, 1987; Virkkunen & Newnham, 2013). Comprehensive accounts of this expansive form of intervention in the context of education research are provided by Bligh & Flood (2015). With its staged but flexible cycle of workshops and tools that support participants to engage through experiential learning it offers a tested methodology by which to stimulate and explore aspects of learning. For the purposes of this study, the methodology is adapted to focus on the relational aspects of working together in the pedagogic form of a Relational Change Laboratory (Hasted, 2019).

An alternative option would have been to explore an existing teaching program to understand whether students developed relational expertise. Phenomenology is one approach that offers a methodology for examining perceptions of a particular social phenomenon (Holstein & Gubrium, 1994). The focus of this approach is to observe the ‘everyday’ and examine practice in situ (Gobo, 2011, p. 25). However, within the study site of the University, there were relatively few opportunities for students to engage relationally with other professionals and those opportunities tended to take the form of activities for individuals, such as temporary placements. Consequently, it was decided that phenomenology was not well suited to the context of this research.
Multiple sources of evidence were captured in order to examine the phenomenon of relational expertise. These included participant observations, viewing the language and behaviors of participants through audio and video recordings of the sessions, the artefacts produced during the intervention, and two follow-up focus groups to clarify the findings.

Engeström (1999) introduces an interesting perspective to approaches to validity and reliability within data analysis, which is relevant to this form of study. He reinforces participants’ central role in interventions and points out that researchers should not presume to have a magic formula to interpret events. To remedy that potential weakness he introduces a model of clarification, asking participants to ‘look at, comment on and make sense of the researcher’s initial data and provisional analysis’ (Engeström, 1999, p. 182). This approach was adopted for the study and a provisional analysis of the findings was discussed with participants during the focus groups.

**Participant selection and ethical considerations**

Purposive, opportunistic sampling was used to recruit the volunteer student participants from the University via emails sent to each department that supported doctoral studentships. The student participants were invited to volunteer based on their interest in literature and reading. Non-academic professional volunteers were recruited by email via the Charity.

Table 1 below summarizes the details of the participants, (note that pseudonyms are applied to protect their identity).

**Table 1: Anonymized details of participants, with pseudonyms applied.**

<table>
<thead>
<tr>
<th>PhD students</th>
<th>Discipline</th>
<th>Stage of PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amy</td>
<td>Classics</td>
<td>Third year</td>
</tr>
<tr>
<td>Cassandra</td>
<td>Linguistics</td>
<td>Second year</td>
</tr>
<tr>
<td>Evie</td>
<td>Gender studies (literature)</td>
<td>Second year</td>
</tr>
<tr>
<td>Ijeoma</td>
<td>Education</td>
<td>Second year</td>
</tr>
<tr>
<td>Jasmine</td>
<td>Literature</td>
<td>Third year</td>
</tr>
<tr>
<td>Kasia</td>
<td>International studies</td>
<td>Second year</td>
</tr>
<tr>
<td>Katherine</td>
<td>Literature</td>
<td>Third year</td>
</tr>
<tr>
<td>Mia</td>
<td>Italian</td>
<td>Third year</td>
</tr>
<tr>
<td>Todd</td>
<td>Literature</td>
<td>Second year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charity participants</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>James</td>
<td>Trustee</td>
</tr>
<tr>
<td>Sonia</td>
<td>Chief Executive</td>
</tr>
<tr>
<td>Adrienn</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Denise</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Flora</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Gloria</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Helen</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Morag</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Rosanna</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Sophia</td>
<td>Charity employee</td>
</tr>
<tr>
<td>Sally</td>
<td>Charity employee</td>
</tr>
<tr>
<td>External participants</td>
<td>Role</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>David</td>
<td>Data expert at sixth-form college</td>
</tr>
<tr>
<td>Paul</td>
<td>Digital publishing specialist</td>
</tr>
<tr>
<td>Saskia</td>
<td>Library employee</td>
</tr>
<tr>
<td>Derek</td>
<td>Digital publishing specialist</td>
</tr>
<tr>
<td>Jamie</td>
<td>Chief Executive of digital</td>
</tr>
<tr>
<td>Roger</td>
<td>Digital publishing specialist</td>
</tr>
</tbody>
</table>

All volunteering participants were included as long as they were able to attend the majority of the formative intervention sessions. Participants received written information about the purpose and design of the research and the aspiration for future publication, to allow for informed consent. They were able to withdraw from the study at any time before, during and for up to four weeks after the workshops. Beyond that timescale, withdrawal would have had a negative impact on the completion of the analysis stage of the project due to the collaborative nature of the program.

The problem object of the intervention was developed in discussion with the University researchers and the Charity professionals. In summary the Relational Change Laboratory centered on how the Charity could develop a sustainable financial model and convert its established physical reading materials into digitally accessible resources able to support people of all ages to read.

All participants were invited to undertake fieldwork, collecting data that might enlighten the group as they came to understand the real-world problem in more depth. This included a range of data and collection methods, from exploring secondary data, to collecting primary data, such as interviews with readers. To prepare participants for this fieldwork the workshops included a training session about the ethical process for data collection.

A four-step data analysis process was applied to examine the data (Braun & Clarke, 2006). First repeatedly reading the data set and recording initial ideas. Second applying coding to consider whether episodes could be construed as an indicator of the features of relational expertise. Third reviewing those episodes and exploring fit with the relational expertise codes and the entire data set to detect points of divergence and congruence. Fourth synthesizing and presenting those findings to the two focus groups with regard to the research question and the literature.

**Summary of the Relational Change Laboratory intervention**

![Figure 1](image)
In total there were nine sessions, Figure 1 above provides a description of each session and details of the methods for data collection. The majority of the sessions were held at the University. The first 2.5-hour session was an introductory workshop for the students, designed to familiarize them with the activity theory model that underpinned the intervention sessions (Engeström, 1987). Students reflected on their own research and the expertise that they might bring to the problem object of the intervention.

The second 2.5-hour session again took place at the University and was designed to stimulate the expansive stage of questioning about the problem object. Building on discussions at the first session, the students had committed to question the problem object through the lens of their own PhD approach. The students then split into self-selecting groups to begin background research on the Charity, applying their individual expertise to the task. The students' initial desk-top research utilized the Charity's website as the most accessible data source and by the end of the session two themes surfaced - first, that the purpose of the Charity had evolved over time and was no longer clear, and second that a lack of service provision for parents was identified.
The third session took place at the Charity's headquarters in London and was the first meeting attended by all students and professional participants. During this 2.5-hour session the students and professional participants began working together in mixed teams. The session began with an introduction to the Relational Change Laboratory and the activity theory model followed by student presentations on their initial reflections with respect to the problem object.

Participants split into two teams to explore the problem object from the perspective of separate user groups of the Charity, with each team comprising a mixture of Charity employees and student researchers. The two teams discussed secondary data already available and discussed new data they would need to collect in order to expand their understanding of the object. Participants committed to working in their mixed teams virtually and in the following two-week period the team undertook data collection about the two user groups.

Session four was an informal session attended at the University by the student participants who engaged with their teams face-to-face and virtually via email, mobile phones and digital platforms. Participants continued their data collection and worked together to prepare for group presentations.

The fifth session was a full six-hour day hosted at the University. All participants attended joined by three external guests; David was a representative of an education partnership linked to the Charity, and Derek and Roger were both digital publishing experts from a UK-based academic publisher. Both working groups presented their research and reflections on the problem object, from the perspective of their Charity user group. Teams recorded their observations from the presentations on two large activity system templates noting existing Charity provision, potential tensions, and potential solutions or ideas. The anonymized content of one of the completed activity system templates is provided in Figure 2 below.

Figure 2: Activity system template completed by participants during Session 5

![Family reading group - data analysis](image)

Finally, participants agreed to model solutions. The first team committed to develop a digital product designed to support family reading activities building on the Charity's existing expertise. The second team agreed to model a digital reading product designed for young people and targeted at UK colleges.

Session 6 was a virtual session attended by the student and Charity participants, following a similar format to session 4 with team members continuing to develop their modelled solutions.
Session 7 was held in London at the Charity's head office attended by the students, nine Charity employees and an external expert, Saskia, from the library service - a close partner of the Charity. During the 2.5-hour session, participants presented their proposed models, refined them through group discussion and then completed implementation frameworks designed to stimulate thinking about key milestones, resources and timelines needed to progress each solution. Following this session the Charity participants were invited to feedback their reflections on the Relational Change Laboratory process, which was provided in the form of a written report. This important artefact highlighted a difference in perceptions of the expertise of the doctoral students, a point that will be returned to later in the paper.

Session 8 took place in London and was attended by all participants together with a new guest, Paul, a research consultant for an academic publisher, invited by the Charity for his digital expertise. The purpose of this session was to facilitate progression to the implementation stage of the Relational Change Laboratory. Participants explained that progress on implementing the two solutions developed at the previous session had halted because of confusion about the best way to take plans forward. Saskia, a Charity employee, returned to discussions initially presented by the students (led by Amy) in session 3 and reinforced what she believed to be the contradiction that was causing this hiatus, namely that the Charity's purpose was insufficiently clear.

Participants began to explore the contradiction in order to understand the Charity's purpose and long-term ambitions. This led the group to pivot their research to concentrate on two aspects of the Charity: re-defining its purpose in the current climate, and defining its value as an organization. Following facilitated discussion the group agreed to split into two teams, one researching data to explore the Charity’s purpose and the second team researching the Charity’s ‘assets’, specifically their internal expertise, materials, and data. The participants then continued to work in their virtual mixed teams and undertook more data collection to expand thinking about the Charity's purpose and the assets at the core of their delivery.

Session 9 comprised an intense final away day at the University that ran for seven hours. The session was attended by an additional expert guest, Jamie, the Chief Executive of a digital content company. It began with a conference when participants presented their findings and the wider group captured their observations on large activity model templates. Participants then analyzed the completed activity models to identify contradictions and then brainstormed potential solutions. Each team developed an implementation plan, setting out the actions required over the next year, they also nominated a representative to progress each implementation plan through the formal structures of the Charity. Participants then contributed to the two separate focus groups – one for the student researchers and one for the Charity employees.

Tracing the development of relational expertise

The following section sets out the analyses of the data, and presents tentative findings in response to the overarching research question, specifically the extent to which relational expertise developed during the intervention.

A case of relational expertise

The flow of expertise is complex and interrelated therefore a case study has been selected to illustrate the progression from individual to relational expertise. The case offers the most distinct example recorded during the study.

During the first session students began framing how they might apply their own research expertise during the intervention. One student, Jasmine, applied her research expertise of reader engagement with books in the 18th Century to explore the physical object of reading materials produced by the Charity. From session 3, Jasmine initiated the design of a survey to expand understanding about approaches to family reading experiences and the role of physical and digital reading materials. Although the survey instrument was well structured and incorporated insights from the Charity participants, only a small number of respondents completed the initial questionnaire. During sessions 4 and 5 she began to engage more closely with the Charity participants, building on their knowledge and expertise of stakeholder engagement to re-circulate the survey and was rewarded with 457 high-quality responses, as illustrated in Figure 3.
The manner in which Jasmine and the Charity participants pulled together called on distributed, relational expertise, in other words drawing on the expertise of practitioners who were informally connected rather than linked by established procedures and goals (Edwards, 2010). By working with the Charity participants who were knowledgeable about the context of the survey and the target audience, Jasmine was able to access their specialist knowledge about who to engage with and how to engage with them to distribute the survey.

Figure 3: Excerpt from a student produced research instrument

In order to distribute the survey and gather valuable data, it seems that Jasmine needed to develop the capacity to interconnect expertise and by doing so she was able to make her own expertise explicit to the Charity and other participants. Reaching the point of interconnecting expertise required a horizontal connection of knowledge and skills beyond the participants' specific domain knowledge.

**Capacity to interconnect expertise: a negative case**

During the data coding process a negative case relating to the relational working feature of the capacity to interconnect expertise became apparent. The artefact of the written report produced by the Charity following session 7 specifically referred to the expertise of the doctoral researchers but it was noticeable that two researchers were singled out. The extract below details the reference to Todd, an education specialist who had experience of working with digital platforms, and Amy a student studying classics.
Table 2: Written report extract produced by the Charity participants

| Report extract | The PHD students had a wide range of interests, expertise and knowledge to contribute. It was felt that Todd was a particularly valuable member of the team due to his experience in education and digital platforms, which made his contribution very pertinent to the discussion and to our work going forward.
Some staff questioned whether a classics student, for example, could realistically contribute to a commercial project. |

As the excerpt in Table 2 above illustrates, the report particularly challenged the relevance of the expertise of the student researching in the field of Classics, with Charity employees questioning the value of a discipline so removed from the problem object.

This response from the Charity was surprising because having traced the coding of the features of relational expertise it was evident that the classicist, Amy, had been the first participant to demonstrate the capacity to recognize and align motives by applying her research skills to articulate the argument that the purpose of the Charity was unclear, in Sessions 2 and 3. By Session 8, the Saskia, the external partner of the Charity, engaged with Amy and reinforced the challenge that the purpose and proposition of the Charity had become indistinct, which was a pivotal moment that surfaced a key tension and enabled the stalled intervention to progress.

This uncertainty about the contribution of the researcher’s expertise is thought provoking and significant and is a point that will be explored in more depth in the discussion section. It is important to reinforce that the design of the Laboratory and the inclusion of recorded audio and visual data allowed for the tracing of these features of relational expertise, which might otherwise have remained obscured.

**Capacity to align motives mutually**

The next section considers the extent to which the relational expertise feature of the capacity to align motives mutually developed during the intervention. The artefacts of most relevance to this issue were the mediating tools applied during the intervention, which are taken in the Vygotskian tradition to reveal participants’ understanding of the world.

Table 3: Origins of mediating tools and their application across the Relational Change Laboratory

<table>
<thead>
<tr>
<th>Expansive learning stage</th>
<th>Mediating tool</th>
<th>Tool introduced by</th>
<th>Data examples of application in the CL</th>
<th>Data examples produced by</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Questioning</strong></td>
<td>Activity model template</td>
<td>Facilitator</td>
<td>Annotated maps of the activity model to plan mirror data.</td>
<td>All participants</td>
</tr>
<tr>
<td>Sessions 1, 2, 3 &amp; 8</td>
<td>Charity website</td>
<td>Students</td>
<td>Basis for mirror data throughout the intervention.</td>
<td>Students</td>
</tr>
<tr>
<td>Sessions 2 &amp; 3</td>
<td>Internet Archive Wayback Machine</td>
<td>Todd</td>
<td>Presentation on the change in the Charity’s website over time.</td>
<td>Todd</td>
</tr>
<tr>
<td>Session 3</td>
<td>Google analytics</td>
<td>Todd</td>
<td>Presentation on the digital strategy of the Charity.</td>
<td>Todd</td>
</tr>
<tr>
<td>Session 3</td>
<td>Qualtrics online survey</td>
<td>Facilitator</td>
<td>Online survey of the reading habits of 16-18 year-olds.</td>
<td>Ijeoma</td>
</tr>
</tbody>
</table>
| **Analysis**  
Session 4, 5 & 9 | Activity model template | Facilitator | Annotated maps of the activity system to analyse the tensions and opportunities in modelled solutions. | All participants |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>After session 5</td>
<td>Qualtrics online survey</td>
<td>Facilitator</td>
<td>Online survey of family reading behaviours.</td>
<td>Jasmine</td>
</tr>
<tr>
<td>Session 5</td>
<td>Qualtrics online survey</td>
<td>Facilitator</td>
<td>Survey designed for college students to explore reading preferences.</td>
<td>Rosanna and David</td>
</tr>
</tbody>
</table>

| **Modelling** |
| --- | --- | --- | --- | --- |
| **Examining**  
Session 7 | Implementation framework | Facilitator | Planning the implementation process for the modelled solutions. | All participants in groups |
| **Implementing**  
then moving to new cycle of questioning and analysis  
Session 8 | Qualtrics online survey | Facilitator | Internal survey to understand the perception of Charity employees about its purpose and brand. | Sally |
| Between session 8 & 9 | Asset mapping | Denise | Exploring the breadth of the Charity’s assets, including mapping: financial, natural, political, human, creative and cultural, social, motivational and built. | Denise |

| **Modelling**  
Session 9 | Business modelling tool | Paul | Exploring the market value of the Charity’s assets through business modelling. | Paul |

Each of the tools applied during the intervention were recorded in the data collection phase. As Table 3 above indicates, the participants applied their expertise to introduce a range of mediating tools and expand understanding of the problem object. Within the study, the source of mediating tools was not restricted to the facilitator; participants introduced a range of conceptual and physical tools that stimulated interpretation of the object throughout the stages of the intervention. Examples included the use of questionnaire software, a website analysis instrument, and a business modelling tool introduced by a digital publishing specialist invited to contribute to the intervention.

Arguably the intentional design of the intervention to encourage all participants to introduce mediating tools contributed to this example of the capacity to align motives mutually. The development of this feature of relational expertise provided a more nuanced understanding of the shared problem object and a legacy of learning about alternative analytical approaches. It is doubtful that one set of contributors working in isolation would have introduced a similar range of analytical tools that expanded the shared problem. Notably this contribution to expanding the problem objet moved beyond the facilitator and doctoral students to engage the expertise of the breadth of participants.
To what extent did relational expertise develop during the Relational Change Laboratory?

At this point, it is helpful to draw together the data and analysis from this study in order to address the research question. Addressing the features of relational expertise, the analysis of the mediating tools summarized in Table 3 suggests that the students were the first to demonstrate the capacity to align motives mutually, by applying their research expertise to analyze the Charity’s website tools during sessions 2 and 3. Initially the Charity participants only applied the tools introduced by the author and it was not session 8 that a member of the Charity and one of the external participants introduced new mediating tools.

The findings also suggest that the Relational Change Laboratory supported the development of expertise from the individual to the relational. In the case of Jasmine, the implications of the single case study were twofold, first, her research interests and expertise appeared to have become objectified, becoming ‘part of the object of activity’ (Edwards 2017, p. 5). As such, the frame through which the participants viewed the object of engaging with readers appears to have expanded beyond that which existed before the Relational Change Laboratory interaction.

Second, the research instrument that Jasmine initiated only gained sufficient traction to produce valuable results once she developed the capacity to interconnect expertise. Arguably, without the development of relational expertise to that extent it is unlikely that the survey would have achieved the significant number of high-quality responses, an outcome that benefitted both Jasmine and the Charity participants.

In each of these examples, the contribution of participants towards relational working manifested in externally observable tools that expanded the problem object. In contrast in the negative case of Amy the evidence of her development of relational expertise was occluded. This may be due to the fact that her contribution was a dialogic intervention rather than an observable tool. It is important to note that the design of the Relational Change Laboratory was such that the contribution of individual participants’ expertise could be traced and recorded through the observations of the intervention.

Discussion

Referring to the literature review, authors argue that doctoral students require preparedness for a boundary-crossing, unstable career path (Coates & Goedegebuure, 2010; Strike, 2010; Whitchurch & Gordon, 2013). By the end of the Relational Change Laboratory there were clear signals that students had been exposed to this future landscape and were developing an understanding of the need to connect their expertise with those from a range of perspectives.

A significant theme arising from the study was the question of perceptions of relational expertise, particularly in relation to the proximity of the practitioners’ expertise to the problem object. The written report extract, presented in Table 2, illustrated the difference in the Charity professionals’ perceptions of the research students’ expertise. This manifested as positive feedback in the case of Todd, whose expertise was considered to align closely with the problem object, in contrast to the uncertainty surrounding the contribution of Amy, the classicist, whose proximity of expertise to the object was considered tangential.

A number of contributing factors may have influenced the participants’ perceptions of Todd and his capability to make his expertise explicit. It was evident that Todd was one of the first participants to introduce a new tool, (Table 3) demonstrating the capacity to align motives mutually. Conversely, Amy, the Classics student similarly applied her humanities expertise to make a crucial contribution to the Relational Change Laboratory, however that expertise was articulated in a dialogic form that was apparently not as visible to participants and was only traced through observation by the author.

In considering relational expertise, the findings from this study are therefore twofold. Firstly, it is proposed that it was the shared problem object that supported participants to begin recognizing and acting on the expertise of their Relational Change Laboratory colleagues in a new context beyond the confines of the students’ field of study (Cryer, 1998; Kelly, 2016; Samuel, 2016). As relational expertise developed, understanding about the object expanded to reveal its complexity. This finding chimes with observations in the scholarship about the importance of a shared problem object at the intersection of practices (Edwards & Stamou, 2017; Kinti & Hayward, 2013).
Second, it is suggested that this form of pedagogic intervention also offers an effective empirical route to follow and explore the contribution of relational expertise rooted in the dialogic contribution of those researchers whose domain expertise appears tangential to the problem object. This ability to trace from the individual to the relational expansion of the object of activity allows for more fine-grained analysis. Doing so has the potential to address some of the assumptions and associated misnomers of the value of the humanities PhD with empirical data.

Although these findings are only based on a single study, the data suggests that the proximity of the object to an individual's presumed field of expertise influences perceptions about their contribution to a Relational Change Laboratory interaction, perhaps speciously. This has implications for potential future collaborations if the involvement of researchers who demonstrate a tangible connection to the problem object are favored in comparison to those with a more oblique, yet still valuable dialogic contribution.

The difference between the findings and the literature is the advancement of understanding about the expertise required to prepare researchers for a relational future (Edwards, 2017). This additional, distinct layer of expertise, which requires students to mobilize their expertise with others in order to problem solve was not recognized by the participants. Arguably, this presents an opportunity to introduce this named form of relational expertise more explicitly, articulated as a distinct capability that students should be supported to develop through doctoral education. If one is thinking about preparing humanities student researchers for a future requiring working across boundaries, then developing an understanding about their own expertise and how they can draw on and contribute towards others is, one could argue, vital. The Relational Change Laboratory, it is suggested, provides a new environment to develop relational expertise in an unfamiliar context.

**Conclusion**

In bringing together the conclusions of this paper, it is important to reflect on the initial objective of this empirical intervention. The study sought to stimulate a live collaboration between doctoral student practitioners and non-academic professional practitioners, with a particular focus on gauging the extent to which relational expertise was developed. The students were not familiar with the concept of relational expertise, therefore rather than asking their perceptions directly, data from a number of sources were examined to explore the development of this distinct form of expertise.

The findings suggest that designing an intervention that underscores the development of relational expertise provides an opportunity for students to engage at the intersection of practices with professionals from multiples perspectives. It is suggested that the Relational Change Laboratory offers a productive learning opportunity to develop and recognize the expertise needed for such out-of-field collaborations. Notably, the intervention also provided an opportunity for all participants, including those from the Charity, to benefit from the outcomes of relational working, with the potential for a wider learning legacy and the opportunity to engage the voices of participants beyond the academic boundary.

It is important to note that the focus on examining a single intervention, within a single institution will limit the breadth of the findings. The study does, however, offer a theoretical and practical contribution to the debate on preparing doctoral students for a collaborative, relational future, through the development of an additional form of horizontal expertise that builds on their discipline-specific training. In particular, it illuminates the potential to stimulate the development of relational expertise through the doctoral training pedagogy of a Relational Change Laboratory.
Orchards in Blossom: Silent language to form an identity in terms of progressive ways of education

Emre Altındağ, Çanakkale Onsekiz Mart University

Abstract

The emphasis of this paper is the silent visuals, which are the images have no intermediary text to communicate. Considering silent visuals in terms of their language and semiotics, may bloom new fractals, which directly relate to the methods, perception of progressive education. When the term of silent visuals regards as a method which is employed by education, especially in terms of students who have learning disabilities, immigrant children or all individuals in broader perspective, this form of art can be evident tool to communicate with them as a unique member of society.

Silent visuals are available to be used in many ways, because of the reason they don’t have to use any intermediary language such as explanatory texts. They already have their language comes from silent images. With the help of these silent visuals, silent texts, silent books, communication barriers formed by modern and post-modern visions may be level up to its next perception. Even in the communities who lack of adequate economy, the form of the silent books can create persuasive possibilities to properly foreseeing the future from now.

To explain the details of silent visuals’ methods, they have their distinct linguistic background emerges from illustrations which are articulated by storytelling. Therefore, the semiotic of it (the communication method) forms on this basis. As the society which the whole of humanity lives in, -apart from the knowledge- the experience is the need for progressive methods of future education. In relation to understand (with) silent books (silent visuals), they mainly depend on the “visual experience” of one’s own. While the nourished acts of analyzing tactics of someone to contemplate and gather necessary pieces to understand an issue/fact lead to learn non-text-based source of information. Accumulated knowledge (vision) comprises experience may be the most prominent necessity to read silent visuals.

When juxtaposing silent visuals with each other, there emerges storytelling, which has infinite silence. These images tell their story -speak without an end. Thus, this power of them may be practiced as a renewable, reinterpretable, expansive field of progressive methods in education. At this point it can be seen as a continual experimentation which is part of progressive education.

As a guide to teachers, while individuality of students deepens with creativity and intelligence as studying on silent visuals, they may develop a more profound social sense to other community citizens as well. Moreover, while one story can be told from different cultural and family backgrounds of one student, it’s possible to “read” and perceive from another perspective from any other. Therefore, while spending more time with silent-picture books (reading /paraphrasing-interpreting activities), generates thought /thoughtfulness, the inquiry become a talent in order to find “a ubiquity meaning” which can be created by each vision of every single individual.

Keywords

Silent language, wordless, silent literacy, picture book, graphic novels
As an introduction

The term of graphic novel, comics and picture book, these consist of many various branches such as bildungsroman, manga, superhero comics, children's books, silent/wordless books, nonverbal-literary graphic novel. Even in the academic studies, they inspire many researchers to discover new perceptions and possibilities in their field no matter which department they are working in. While exploring their interminable potentials to create new ways of communication (especially in terms of silent/wordless ones), they may be considered even more by educational studies in the future, as they already prominently regarded in arts and humanities.

Regarding my PhD study in order to obtain some evidence-based data to illustrate their relations with children and youth education more, the comments and reactions of the students on the textless/silent visuals will be observed with the help of the reader-response theory of Louise Rosenblatt (1978). This theory divides the act and experience of reading into two parts as informative (reading for informational purposes) and narrative (aesthetically reading) (Rosenblatt, 2004). Through the end of my thesis, it will be studied how students interpret silent visuals from an aesthetic aspect by going through the narrative reading type of this theory. In doing so, the content of silent books in which have more aesthetic values (in terms of the artistic context) will be concerned as to discover their language ways and semiotics.

In order to communicate with children, youth or elders deeply, prospective studies for an informational reading of silent visuals and focusing on observations and comments of children on more informative texts can be practical to expand the fields of use in education and textless/silent visuals. While studying especially on learning and reader responses, may widen up the perceptions in this new research area.

Through Rosenblatt Reader-Response Theory, to observe children's reactions when they see silent visuals, how they think about these visuals in terms of aesthetics (narrative), I will prepare also the informative questions and instructions to lead them to discover the background of the visuals. Besides, it is also expected to obtain the data about how students’ structure and interpret the information through silent visuals. However, the children's reactions and comments about the visuals will be always evaluated primarily in terms of narrative reading. In order to learn the feelings and opinions of the children, the accurate questions will be one of the most important issue to be determined. When children see the visuals, I will also guide them to share their feelings in a narrative way through the questions. Thus, the evidences about how silent books reveal the emotions of children and to see their feeling way rather than what they learn, will be studied from the visuals without text.

While grasping the aesthetic background of silent visuals within the framework of my PhD research, will help to reveal their relation to primary school education as well. At the end of the thesis rather intriguing findings expected to be explored. I will consider silent visuals as a sub-title of the term nonverbal-literary graphic novel and picture book in almost every stage of the study. Besides, considering silent books as an integrated form of art, they have distinguished relationship with the art of storytelling in visual arts (including cinema, theatre and performative arts) and musical harmony, however, these issues will be the starting point of another paper.

A storytelling with silent text-free visuals offers children unlimited reading opportunities. It can be said that the definition of reading here is rather based on feeling. With regards the imagination, which can emerge more utterly in children, and creating an idiosyncratic act of reading activity of them, may help them produce more clear interpretation and understanding of silent visuals by feeling them in different aspects. Thus, a story created with silent visuals can lead to many ways of readings (feelings) and understandings, which can reveal precious observations and data in children's education. This may create the very valuable way to see the understanding the imagination of children and discovering how they learn, understand and feel within it.
The form of silent books/visuals has the value of being able to communicate with children without creating any language barrier. At this point, it can be said that refugee children living in the society, children speaking foreign languages, and even disabled individuals look at the same image and an act of “understanding” is carried out in their own world of feeling and perception.

A good silent book is waiting to be discovered by teachers as a hidden gem which contains valuable teaching tools where each child, as well as youths and elders, can create their own story and discover themselves by realizing the own unique experiences, level of knowledge, emotional depth and details just belong to them.

**Silent Visuals and Progressive Education**

Silent visual and silent storytelling, which contains a universe in which every reader can discover the way to himself in terms of structure, is actually quite intertwined with the progressive education method in this respect. It can be observed that the progressive education approach, which constantly evolves and creates peculiar transformations as a good learning method, is in a rather close relationship through the narrative form presented to the reader (viewer/audience) of the silent visuals. Silent stories and silent narrative ways have the ability to trigger the motivation of each individual to create their own story in their inner world. Silent stories, which can be read from different perspectives and contain values in terms of bring about an awareness of each (creative) individual in his own inner space, which also has an essential place for an understanding of progressive education.

Concerning of the term of *state* through Plato and Aristotle, they argued that each creative individual should realize himself in his own “inwardness” and then experience this as a completion within a community, and thus the aforementioned state term’s understanding would already emerge in line with the “completion” of these creative individuals (Bruce, 2013). The community at this point, the state (adapting the term with a perception of education) - can become evident by focusing on each individual’s own story and journey, and with the versatile communication methods of silent stories, children and individuals of almost all ages, at opposed socio-economic levels, at dissimilar levels of intellectual and cultural perceptions, it can even communicate non-verbally to individuals speaking in diverse languages, one by one, through the same image or story. This, in turn, encourages each individual here to create an expanding structure within a community, and can establish a very open (expanding) growth area, a construction ground. Thus, it brings with it a sentimental (based on inwardness/comes from inherence) but pragmatic network where every child, individual and teacher, who constructs their own story in constant and shares them in interaction with other people around them.

Every story learned from a silent storytelling thus comes into being as a story that goes towards each individual, knows him/herself and belongs only to him/herself. This is one of the approaches that will encourage and wake the imagination of children, as well as expand their boundaries and be aware of their infinity, and inspire them to discover themself in the light of silent visuals, stories and books. This is the possibility to open the doors of new perceptions (Blake, 1994) for children, youths and elders as well - by shaping them in the vision of progressive education.
A book within the notion of silent literacy

As the term of progressive methods in education is considered thorough its broadest meaning, the form of silent books leading this paper to broaden and deepen its scope. In doing so, constructing one’s own identity is regarded by understanding the wordless/silent language comes from silent books/visuals. The terms such as silent books or silent visuals are used as a common definition for all picture book forms, including graphic novel, comics, children’s book -however as such only wordless/silent. Certain points within this paper these terms are preferred to refer some other visual art forms such as painting, calligraphy (in terms of its artistic visuality only), marbling, drawing and expressions within cinema and performative arts. In particular cases, through the form of silent book regarded as ideal art form within all other branches of fine art to investigate to common language among people to shape the literacy of silence.

In these ending years of 21st century, one of the major problematic situations stands against education and art industry(!) is the excessive unnecessary text-usage for the artworks –produced by the artists, critics or educators. While doing that, audience/students have rather lacked inwardness to contemplate the behind of artwork’s curtain. The issue, which is trying to be articulated here, is not that the constructive (academic) background of an artwork, is the intuition of the intimateness which lives, lies beyond the surface of artwork.

To contemplate this sensual communication or sentimental seeing way; an artwork should be considered as a whole (Klee, 1967; 1968), and the term, the notion of silent literacy will facilitate the process of this knowledge not just to influence, utterly penetrate to the mind of human which involves heart and soul, past and future –the moment in it.

Concerning the term of progression in education as a learning method may be regarded as a nexus to forge ahead through the inward, transcendental state of the seeing -seeing while perceiving the sensual frequencies (Kandinsky, 1977; 1979) on the plate of the artwork. Learning the method of the senses with the help of textless images, visuals –they facilitate to communicate with the inside space of one’s own and the environment.
Thereafter, the inward eye will be awakened –walks on the world(s) of wordless/silence visuals.

Human as a reference point to contemplate the nature, world and whole universe, -also human as a reflector to all of the life forms and elements, in art; also, human should consider him/herself as in the mission to read. Reading and to live, reading for living and forming. The artwork is a kind of artefact telling the stories of the universe from the human eye which is the eye of to the most talented to define, discriminate, contemplate to its around -among the creatures (Klee, 1961; Kandinsky, 1977; Tarkovsky, 1989; Tolstoy, 1995).

An art which points out, stares, focuses on the junction points of the lines. The area full of pure frequencies which directly, softly induce the inwardness of one's oneself. To inspire someone to recognize -get to know him/herself more and more –while watching of it. Artworks pursue the purity and communication (not in a designative way). The word of communication here used as transmission, -transmission to (from) "lightness". A channel begins with one's (someone) him/herself towards themselves once more, relentlessly. A channel begins from the one's oneself and then –not finish –towards infinite cyclical completion, keeps ongoing to its perennial journey. An artwork (silent book) which stimulates this realization urge of someone's self-inside.

The point of time of today in which knowledge/truth is only as temporary strip which is just glanced at, the time in which the truth has stuck between materialist tendencies. The time in which information (idea(s)), images and scenes are constantly changing and transforming, to illustrate that multiple frames in the same page can be “followed”, “read” in different “directions” in harmony may unveil some new methods of perceptions –while infertile sameness conquers almost every corner on minds. In this new era, how do the images that overlap each other (through the human eye as if a camera and script) shape the perception of the human and to the future -through the humble form of a silent book?
Image 4: Shaun Tan, from "Arrival", as originally published in 2017 by Hodder Children's Books
Away from symbols

The form of silent book may trigger to overthrow over-usage of texts, words, expositions (commentaries) at first on artworks. After that minds may select, analyze and interpret the cleansed visuals, stories from more purified inwardness. That may also induce the inner communicative ways between people and other forms of life (Guénon, 2004; Thoreau, 2015). Through this school of thought, conceiving the inwardness may bring forth a rare communication way which extends beyonds. Starting from the sense -the veiled channel to an artwork – then this channel to other people –then to the nature (trees, birds, oceans which they are being in) –and then to the worlds (-to the term of more expansive: universes) of “beyond/s” (Emerson, 2003; Le Guin, 2019).

Image 3: Moebius, from “Upon a Star”, as originally published in 1990 by Epic Graphic Novel
Silent book form involves, stretches out to the apparent forms such as placing its story into the bedded structures; juxtaposed, diagonally, bottom to top, from top towards bottom, interbedded (from inward to outward, from outer levels (borders) to inwards (these forms, methods of its storytelling expand endlessly in the process of time—it has that in its own genesis)–whether in terms of philosophic, metaphoric or the exact apparent, technical condition (medium) of the ways of its time-lapse/like storytelling, it paraphrases the time in the sense of “time-lapse” in it, while the deceptive visual/ness of the current era impresses countless fields in terms of spiritually (mind) -form of the silent book express “the ideas”, “the senses”, “the inwardness”, “the one/ness” from/through well-grounded (which is structured by plain, modest, versatile, ability to be seen its essence from “first-hand” because of the potential possibilities in the form of its storytelling approaches (Klee, 1973; Groensteen, 2009).

In terms of the form and philosophy of “silent book” can be considered as a springboard to launch out the discoveries of new universes of language, communication ways, unveil the new and fresh relationship doors with the nature and its behind.


A character which is used to tell a story holds a silent universe in its background. While it creates words, sentences and – meaning, there appears a story. An academic article, essay, scientific reports also can be considered as sort of stories at this point. Each one of living-thinking-experiencing human has this -to hear or to tell a story. No matter which tool is preferred to do this, everything walks on “storytelling” to depict (visualise) -the around.
Image 5: Moebius, from “The Gardens of Aedena”, as originally published in 1988 by Epic Graphic Novel
References


Schooling through uncertainty: Social-emotional learning intervention as path to overall student resilience – A systematic review

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Abstract

This systematic review identified social-emotional learning (SEL) intervention studies conducted in primary schools with typically-developing children across middle childhood. A resilience framework (synthesized from the fields of psychology, education, and sociology) was used to map SEL program components and assessments from included studies onto said framework to identify trends in which areas of resilience (both protective and risk factors) have been targeted by schools and most frequently assessed in students within the past decade. Resilience can be broadly understood as the set of skills that allows a person to overcome adversity to return to or maintain positive mental health and wellbeing. Many SEL skills overlap with those integral to cultivating resilience, yet SEL intervention studies do not consistently state an explicit aim of promoting resilience. How to cultivate resilience through education is even more pressing as the world adapts to the disruption of COVID-19, resulting uncertainty, and its impact on the future. As such, the goal of the review was to identify ways in which resilience-related skill development via social-emotional development in education settings can be maintained as students enter adolescence and beyond.

Method

A broad search conducted via 17 online databases and a manual search of references included in 18 meta-analyses of SEL programs returned a total of 11,225 records. After pre-screening of titles and abstracts, 124 intervention studies were included for full-text review to assess eligibility and quality-rated by two reviewers. Forty-six studies with children ages eight to 11 and published from January 2009 to December 2020 were included for: 1) presence of a SEL program universally implemented during the school day that targeted resilience skill development, 2) use of a standardized outcome measure of resilience, 3) lack of sample pre-screening, and 4) a high quality rating of methodological rigor. SEL program components and study outcome measures were mapped onto a resilience framework comprised of 15 protective factors and five risk factors drawn from the research literature.

Results

Thirty-four different SEL programs were identified across included studies. Resilience factors targeted by at least 75% of programs were: ‘cognitive competence,’ ‘coping skills,’ ‘self-efficacy/autonomy,’ and ‘social competence.’ Resilience factors assessed in at least half of included studies were: ‘coping skills,’ ‘negative affect,’ ‘self-efficacy/autonomy,’ and ‘social competence.’

Conclusions/Discussion

This systematic review highlights how skills to promote resilience cited in other fields have been developed in schools within the broader SEL framework and addresses how direct instruction in such skills can transform the learning environment into a protective factor by equipping students with multiple internal protective factors to thrive and weather uncertainty. Overall, resilience protective factors were targeted by SEL program components whereas resilience risk factors were most often assessed as outcome measures. This review ends by considering how SEL pedagogy to promote resilience translates to online learning, especially the dynamics of maintaining connectedness via virtual teacher-student and peer relationships.
Introduction

Schools, as formative institutions at both intellectual and personal levels, have the potential to promote skill development within future generations so that they can better face challenges and resulting uncertainty. Fostering the ability within students to adapt and overcome a myriad of situations is key, but what does it mean to be resilient?

Defining Student Resilience

Resilience in its figurative sense can be understood as a set of skills that allows a person to overcome adversity to return to or maintain positive mental health and wellbeing (Ungar, 2008). Conceptual reviews of the construct of resilience and related terms stress the need for clear definition and operationalization, noting resilience as a multidimensional process or phenomenon of competence despite adversity that can be achieved at any point during the life cycle (Connor & Davidson, 2003; Lee et al., 2012; Luthar et al., 2000; Shaikh & Kauppi, 2010).

Resilience is often discussed in the field of psychology to describe how individuals “bounce back” to a state of healthy functioning after experiencing challenge, adversity, or crisis (Prince-Embury et al., 2016). A meta-analysis conducted by Lee et al. (2013) indicated the following to influence resilience: two demographic factors of age and gender; six protective factors of life satisfaction, optimism, positive affect, self-efficacy, self-esteem, and social support; and five risk factors of anxiety, depression, negative affect, perceived stress, and posttraumatic stress disorder (PTSD). The psychological perspective on resilience promotes the importance of considering six areas including personality traits, positive outcomes despite an individual’s high risk or exposure to adversity, factors associated with positive adaptation, processes, sustained competent functioning and/or resistance to stress, and recovery from trauma or adversity, whereas sociology defines resilience from the perspective of human agency, resistance, and survival (Shaikh & Kauppi, 2010). Furthermore, resilience in sociology considers not just the availability of support to an individual, but also the individual’s active engagement with such resources and decision-making (Masten, 2014), emphasizing thus the importance of agency when defining resilience (Hitlin & Elder, 2007).

In the field of education, resilience refers to success in school despite adverse circumstances, whether due to individual traits or experiences (Wang et al., 1994), and emphasizes in particular the achievement of students who come from socially or economically disadvantaged backgrounds (Waxman et al., 2003). Martin and Marsh (2006) found five factors predicted academic resilience in their study with 402 Australian high school students including self-efficacy, control, planning, low anxiety, and persistence. Morrison and Allen (2007) also identify five aspects of resilience including autonomy, sense of purpose, social competence, problem solving, and achievement motivation, in addition to their respective risks to educational performance, what needs to be strengthened for each characteristic to enhance educational adaptation, and the protective possibilities or actions that can be taken by the teacher, school, or families. Difficulties in defining resilience and the possibility of designing programs to promote it accordingly have been noted (e.g., Kaufman et al., 1994). However, resilience can still be understood across disciplines to comprise risk factors and protective factors, especially when considering it as a developmental outcome for children and adolescents (Fergus & Zimmerman, 2005; Lee & Stewart, 2013; Zolkoski & Bullock, 2012).

Social-Emotional Learning to Promote Student Well-Being

Social-emotional learning (SEL) is a form of pedagogy that stresses the need for direct instruction in social-emotional skills, and stems from the empirical basis for the relationship between academic performance and traditionally “non-academic” skills (Panayiotou et al., 2019a). A similar field dedicated to school-based wellbeing promotion is that of positive youth development (PYD), with SEL at times being considered a PYD approach (see Durlak et al., 2011 and Taylor et al., 2017 for meta-analyses).
Resilience has also been cited as a PYD construct (Lee et al., 2012), but the same characterization is not as readily found in the SEL literature despite an overlap in skill development focus. This is not due to disagreement within the field over whether SEL is related to resilience promotion or PYD, but rather could be tied to the fact SEL frameworks do not necessarily presuppose the presence of risk or adversity unlike resilience-focused interventions (Garmezy, 1991; Haggerty, et al., 1994; Luthar & Zigler, 1991; Masten et al., 1990). SEL programs may be closer aligned with positive psychology (e.g., Van Zyl & Rothman, 2019) or the concept of “flourishing” (Seligman, 2011) in their shift away from a deficit-based approach (Durlak et al., 2015; Elias & Arnold, 2006; Hoerr, 2019; Humphrey, 2013; Rogers, 2019).

The Present Study

The present study is a systematic review that addresses the following research question: which facets of resilience have been promoted and assessed in educational settings via universal SEL interventions? The review focuses on interventions conducted across middle childhood as it is an important period both academically, being right before the transition to secondary school, and developmentally when considering changes that occur in social-emotional skill, whether an increase in emotion understanding (Castro et al., 2016; Pons et al., 2003; Vitulić, 2009) and regulation (Penela et al., 2015) or a burgeoning moral sense (Christner et al., 2020). Positive social-emotional development and fostering resilience in childhood can lead to positive developmental trajectories in adolescence and even adulthood (Masten & Tellegen, 2012). As such, focusing on how SEL interventions administered in middle childhood address student resilience can provide meaningful insights into how schools equip students with skills to support their wellbeing throughout their later academic lifespan and beyond.

How students are assessed in SEL intervention studies can also reveal embedded conceptualizations of what is considered essential to student social-emotional development, and their operationalizations across studies can continuously shape what it means to be resilient in schools, especially in instances where certain assessments are recurrently used. As such, this systematic review mapped both SEL intervention program components and resilience-related student outcome measures onto a resilience framework to a) further unite conceptualizations of SEL skill and resilience, and b) indicate recent trends of how resilience has been taken up in the classroom via SEL intervention.

Method

Search strategy and search terms

Two approaches were adopted to complete the search strategy to identify school-based intervention studies conducted within the past decade with typically developing children ages eight to 11 and comprising a SEL program. The first involved consultation of 17 different online databases pertinent to the research fields of education, psychology, linguistics, and the social sciences. The following search terms and search field specifications were used:

<table>
<thead>
<tr>
<th>(Abs)</th>
<th>social skill OR socio-emotional OR social-emotional OR SEL OR social-emotional learning OR socio-emotional learning OR social competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>AND</td>
<td>children OR primary education OR school grade OR primary school</td>
</tr>
<tr>
<td>OR</td>
<td>Intervention OR program*</td>
</tr>
</tbody>
</table>

All records generated from the online search were then uploaded to Rayyan, a freely available web software for systematic reviews so that records could be deduplicated, inclusion decisions made by two independent reviewers (including the author), and full-text PDFs uploaded as attachments for each record.
The second approach for the review’s search involved consulting meta-analyses of SEL intervention studies published within the past decade. The researcher manually consulted the reference lists of relevant meta-analyses to identify studies published within the target year range (i.e., 2009 to 2020) and that included a study sample in the target age band. Skills targeted by interventions related to social-emotional development are not necessarily consistently stated as being part of SEL pedagogy despite their use of SEL programs. As such, cross-referencing between meta-analyses on social-emotional skill development and records generated by the online database search was part of an effort to ascertain with greater certainty the breadth of intervention studies from the past decade that used SEL programs. Furthermore, meta-analyses specifically concerned with SEL do not necessarily restrict their focus neither to intervention studies conducted during the school day, nor to the age-band of middle childhood alone as is done in the present review.

**Figure 1:** PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) Search Flow Diagram

**SEARCH STRATEGY 1 (S1) SEARCH STRATEGY 2 (S2)**

- Records identified through database
- Records identified through meta-analysis reference

**Identification**

Records after duplicates removed

(S1 n = 11,162) (S2 n = 63)

**Screening**

Records screened  
(n = 11,225)

Records excluded  
(n = 11,100)

**Eligibility**

Full-text articles assessed for eligibility  
(n = 124)

**Included**

Studies included in qualitative synthesis  
(n = 46)

Full-text articles excluded, with reasons  
(n = 78)

- n = 22 for methodological rigour/lack of transparency in reporting of measures and intervention components
- n = 12 for having pre-screened/targeted sample
- n = 10 for study design type (e.g., secondary data analysis)
- n = 10 study setting
- n = 9 lack of standardized resilience outcome measure
- n = 7 for age band
- n = 6 for relevance/study focus
- n = 2 for lack of full-text access
Inclusion/Exclusion Criteria

The total number of records identified via the two-pronged search strategy described above (Figure 1) was 11,225. The following inclusion/exclusion criteria were used as part of the initial screening process:

**Table 1: Summary of Inclusion and Exclusion Criteria used in Systematic Review Search Strategy**

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study published 2009 - 2020</td>
<td>Study published prior to 2009 or post December 2020</td>
</tr>
<tr>
<td>Peer-reviewed article</td>
<td>Not an article from peer-reviewed journal (e.g., is conference proceeding, thesis)</td>
</tr>
<tr>
<td>Full-text available</td>
<td>Full-text unavailable</td>
</tr>
<tr>
<td>Written in English, French, German, or Spanish</td>
<td>Written in language not understood by primary researcher</td>
</tr>
<tr>
<td>Presence of SEL Program that:</td>
<td>Lack of SEL program or program does not have explicit resilience promotion</td>
</tr>
<tr>
<td>• Has explicit component dedicated to developing facet of resilience</td>
<td>Not an intervention study/focus</td>
</tr>
<tr>
<td>• Is school-based/delivered during school day</td>
<td>SEL program administered after-school or in home/with family</td>
</tr>
<tr>
<td>• Is universal for classroom participants</td>
<td></td>
</tr>
<tr>
<td>Intervention study focused on impact of SEL program: RCT, pre-/post-test, quasi-experiment</td>
<td></td>
</tr>
</tbody>
</table>

**Participants:** typically developing children ages 8 to 11/ in Years 4 to 6 (3rd – 5th grades)*

Presence of at least 1 standardized outcome measure assessing facet of resilience

**Quality Rating Process**

All studies included in the systematic review underwent a quality rating process by two independent reviewers (including the author) focused on relevancy and methodological rigor informed by Mertens’ (2015) criteria. Each article was assigned a quality rating on a scale of 1 to 4, with 1 indicating “low quality” and 4 indicating “high.” Studies rated as ‘1’ or ‘2’ were excluded. A Cohen’s kappa was calculated to establish inter-rater reliability after a third of full-text articles had been read for eligibility (n = 41). The calculated Cohen's kappa value was .356, considered “fair” based on interpretation guidelines produced by Altman (1999). Consequently, it was decided that both reviewers would read and quality rate all full-text articles before making final inclusion decisions for the systematic review. The description of each quality rating value was also further specified. In instances where there was disagreement, both reviewers discussed their reasoning behind their respective quality ratings to reach a final inclusion decision.

**Qualitative Analysis and Synthesis**

An additional preliminary question was addressed to carry out the qualitative synthesis of the systematic review: how has resilience been defined across the fields of education, psychology, and sociology? A framework of constructs related to resilience was synthesized from relevant literature (namely systematic reviews, meta-analyses, and conceptual papers) and organized as 15 protective factors and five risk factors (Table 2):
### Table 2: Resilience Framework Used in Conceptual Mapping Exercise

<table>
<thead>
<tr>
<th>Protective Factor</th>
<th>Academic Competence</th>
<th>Achievement Motivation</th>
<th>Cognitive Competence</th>
<th>Cooperation &amp; Communication</th>
<th>Coping Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protective Factor</strong></td>
<td>Family/Peer Relationships</td>
<td>Life Satisfaction</td>
<td>Optimism</td>
<td>Positive Affect</td>
<td>Problem-Solving (Skills)</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>Dray et al. (2017)</td>
<td>Lee et al. (2013)</td>
<td>Lee et al. (2013)</td>
<td>Lee et al. (2013)</td>
<td>Dray et al. (2017); Morrison et al. (2007); Waxman et al. (2003)</td>
</tr>
<tr>
<td><strong>Protective Factor</strong></td>
<td>Self-efficacy/autonomy</td>
<td>Self-esteem</td>
<td>Sense of Purpose</td>
<td>Social Competence</td>
<td>Social Support</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>Dray et al. (2017); Lee et al. (2013); Morrison et al. (2007); Waxman et al. (2003)</td>
<td>Lee et al. (2013)</td>
<td>Morrison et al. (2007); Waxman et al. (2003)</td>
<td>Morrison et al. (2007); Waxman et al. (2003)</td>
<td>Dray et al. (2017); Lee et al. (2013)</td>
</tr>
<tr>
<td><strong>Risk Factor</strong></td>
<td>Anxiety</td>
<td>Depression</td>
<td>Negative Affect</td>
<td>Perceived Stress</td>
<td>PTSD</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>Lee et al. (2013)</td>
<td>Lee et al. (2013)</td>
<td>Lee et al. (2013)</td>
<td>Lee et al. (2013)</td>
<td>Lee et al. (2013)</td>
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</tbody>
</table>

Based on what was reported in each study to describe an SEL program, lesson names and aims were extracted into a spreadsheet. Lessons were then mapped based on their focus to facets within the resilience framework. Outcome measures for each intervention study included in the systematic review were also extracted into a spreadsheet, as well as the target construct assessed that was then mapped onto the resilience framework. To complete the mapping exercise, each lesson or outcome measure construct was coded with a value of 1 for a particular resilience facet to indicate the SEL program or assessment had targeted it. A resilience facet was considered “frequently” targeted across SEL programs and outcome measures if it had been coded for in at least half of SEL programs and included studies, respectively.

**Findings**

**Summary of Included Studies**

A total of 34 SEL programs were identified across included intervention studies. This number is lower than the total number of included studies \((n = 46)\) as some studies employed the same SEL program. A resilience facet was considered frequently targeted when it was mapped in at least 17 SEL programs and assessed in at least 23 studies. The following table presents descriptive information on studies included in the systematic review (Table 3):
<table>
<thead>
<tr>
<th>Study [Country]</th>
<th>Design</th>
<th>Child Participants (n)</th>
<th>Age Band (Years)/ UK School Grade</th>
<th>Social-Emotional Learning Program</th>
<th>Resilience-related Student Outcome Measure Constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahlen et al. (2018) [Sweden]</td>
<td>Cluster-randomized Effectiveness Study</td>
<td>695</td>
<td>9 to 10/ Years 4 and 5</td>
<td>FRIENDS for Life</td>
<td>Anxiety Symptoms, Depressive Symptoms, Mental Health, Academic Performance</td>
</tr>
<tr>
<td>Amundsen et al (2020) [UK--England]</td>
<td>Pre-test/ Post-test (with waitlist &amp; active controls)</td>
<td>108</td>
<td>9 to 10/ Year 5</td>
<td>Living Mindfully Program, UK</td>
<td>Mindfulness, Psychology and Subjective Wellbeing, Emotion Regulation</td>
</tr>
<tr>
<td>Berger et al. (2014) [Chile]</td>
<td>Quasi-experiment</td>
<td>647</td>
<td>8 to 10/ Years 4 and 5</td>
<td>BASE (Bienestar y Aprendizaje Socioemocional)</td>
<td>Social-emotional Wellbeing, Self-Esteem, Social Integration, Academic Performance</td>
</tr>
<tr>
<td>Carroll et al. (2020) [Australia]</td>
<td>Pre-test/Post-test within subjects</td>
<td>524</td>
<td>8 to 12/ Years 5 to 7</td>
<td>KooLKids Whole of Class</td>
<td>Social-emotional Competence, Behavioral/emotional Problems, Academic Achievement and Effort</td>
</tr>
<tr>
<td>Coelho &amp; Sousa (2017) [Portugal]</td>
<td>Quasi-experiment</td>
<td>982</td>
<td>10 to 12/ Years 6 and 7</td>
<td>Positive Action Social-Emotional Competencies</td>
<td>Social-Emotional Competencies, Self-Esteem</td>
</tr>
<tr>
<td>Collins et al. (2014) [UK--Scotland]</td>
<td>Between subjects; 3 (group) x 3 (time) mixed design</td>
<td>317</td>
<td>9 to 10/ Year 4</td>
<td>Researcher-developed CBT-based</td>
<td>Coping Skills, Anxiety Symptoms</td>
</tr>
<tr>
<td>Crean &amp; Johnson (2013) [USA]</td>
<td>Cluster-randomized Trial</td>
<td>779</td>
<td>8 to 11/ Years 4 to 6</td>
<td>Providing Alternative Thinking Strategies (PATHS)</td>
<td>Acting Out Behavioral Problems, Aggression, Conduct Problems, Victimization at School, Normative Beliefs About Aggression, Hostile Attribution, Bias and Aggressive Interpersonal Negotiation Strategies, Aggressive Social Problem-Solving</td>
</tr>
<tr>
<td>Study Authors (Year) [Country/Region]</td>
<td>Design</td>
<td>Sample Size</td>
<td>Age Range</td>
<td>Interventions</td>
<td>Outcomes</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------</td>
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</tr>
<tr>
<td>Daunic et al. (2012) [USA]</td>
<td>Randomized Controlled Trial</td>
<td>1,296 7 to 12/ Years 3 to 7</td>
<td>Tools for Getting Along (TFGA)</td>
<td>Aggression Anger Expression Social Problem-Solving Skills and Hostile Attribution Biases</td>
<td></td>
</tr>
<tr>
<td>de Carvalho et al. (2017) [Portugal]</td>
<td>Quasi-experiment</td>
<td>454 8 to 10/ Years 4 and 5</td>
<td>MindUp</td>
<td>Emotional Control Experience of Positive and Negative Affect Self-Compassion Mindfulness</td>
<td></td>
</tr>
<tr>
<td>Duncan et al. (2019) [USA]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>1,169 8 to 14/ Years 4 to 9</td>
<td>Positive Action SEL Skills Parent-Child Relationships Peer Influences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filella-Guiu et al. (2014) [Spain]</td>
<td>Quasi-experiment pre-test/ post-test (with control)</td>
<td>651 6 to 12/ Years 2 to 7</td>
<td>Social Skills Improvement System Classwide Intervention Program (SSIS-CIP)</td>
<td>Emotional Intelligence</td>
<td></td>
</tr>
<tr>
<td>Flook et al. (2010) [USA]</td>
<td>Randomized Controlled Trial</td>
<td>64 7 to 9/Years 3 and 4</td>
<td>InnerKids Program</td>
<td>Ability to guide/ organize cognition, emotion &amp; behavior</td>
<td></td>
</tr>
<tr>
<td>Fraser et al. (2014) [USA]</td>
<td>Sequential Cohort-Control</td>
<td>688 8 to 9/Year 4</td>
<td>Making Choices Program</td>
<td>Child Classroom Behavior</td>
<td></td>
</tr>
<tr>
<td>Gallegos et al. (2013) [Mexico]</td>
<td>Quasi-experiment (non-equivalent control group)</td>
<td>1,030 8 to 13/ Years 5 and 6</td>
<td>FRIENDS for Life (Spanish Version)</td>
<td>Anxiety Symptoms Depression Coping Skills</td>
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</tr>
<tr>
<td>Goossens et al. (2012) [The Netherlands]</td>
<td>Quasi-experiment</td>
<td>1,223 5 to 11/ Years 1, 4, and 6</td>
<td>Providing Alternative Thinking Strategies (PATHS)</td>
<td>Social-Emotional Competence</td>
<td></td>
</tr>
<tr>
<td>Humphrey et al. (2016) [UK--England]</td>
<td>Randomized Controlled Trial</td>
<td>4,516 7 to 9/Years 3 and 4</td>
<td>Providing Alternative Thinking Strategies (PATHS)</td>
<td>Social-Emotional Competence Mental Health Difficulties</td>
<td></td>
</tr>
<tr>
<td>Humphrey et al. (2018) [UK--England]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>5,218 7 to 9/Years 3 to 5</td>
<td>Providing Alternative Thinking Strategies (PATHS)</td>
<td>Social Skills Prosocial Behavior Mental Health Difficulties Health-Related Quality of Life Academic Attainment</td>
<td></td>
</tr>
<tr>
<td>Ialongo et al. (2019) [USA]</td>
<td>Randomized Controlled Trial</td>
<td>5,611 5 to 11/Year 1 to 6</td>
<td>PAX Good Behavior Game; PATHS</td>
<td>Child Adaptation to Classroom Social-Emotional Competence</td>
<td></td>
</tr>
<tr>
<td>Johnstone et al. (2014) [Australia]</td>
<td>Randomized Controlled Trial</td>
<td>370 8 to 9/Year 4</td>
<td>Aussie Optimism Program Positive Thinking Skills (AOP-PTS)</td>
<td>Depression Anxiety Symptoms Positive and Negative Affect</td>
<td></td>
</tr>
<tr>
<td>Study Authors (Year)</td>
<td>Intervention Design</td>
<td>Sample Size</td>
<td>Age at Baseline</td>
<td>Program Description</td>
<td>Outcomes</td>
</tr>
<tr>
<td>----------------------</td>
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<td>-------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Joyce et al. (2010)</td>
<td>Pre-test/Post-test within subjects (pilot)</td>
<td>743</td>
<td>10 to 13/ Years 6 and 7</td>
<td>Researcher-developed Mindfulness Program</td>
<td>Emotional and Behavioral Problems Depression</td>
</tr>
<tr>
<td>Kiviruusu et al. (2016) [Finland]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>3,704</td>
<td>6 to 9/Years 2 to 4</td>
<td>Together at School</td>
<td>Social-emotional Skills Psychological Problems</td>
</tr>
<tr>
<td>Kraag et al. (2009) [The Netherlands]</td>
<td>Cluster Randomized Control Trial (delayed intervention with random assignment)</td>
<td>1,467</td>
<td>11 to 12/ Years 6 and 7</td>
<td>Learn Young, Learn Fair</td>
<td>Aggression and Emotional Problems</td>
</tr>
<tr>
<td>Leadbeater et al. (2016) [Canada]</td>
<td>Longitudinal Study</td>
<td>1,329</td>
<td>6 to 10/ Years 2 to 5</td>
<td>WITS Program</td>
<td>Peer Victimization Social Responsibility Prosocial Leadership Peer Victimization Aggression and Emotional Problems</td>
</tr>
<tr>
<td>Lee et al. (2018) [South Korea]</td>
<td>Pre-test/post-test (with control)</td>
<td>54</td>
<td>10 to 11/ Year 6</td>
<td>Researcher-developed empathy program</td>
<td>Cognitive and Affective Empathy Academic Engagement</td>
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<tr>
<td>Lewis et al. (2016) [USA]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>1,178</td>
<td>8 to 14/ Years 4 to 9</td>
<td>Positive Action</td>
<td>Self-development Self-control Self-concept Peer Affiliations</td>
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<tr>
<td>Mateu-Martinez et al. (2013) [Portugal]</td>
<td>Quasi-experiment, pre-test/ post-test (non-equivalent control group)</td>
<td>94</td>
<td>8 to 12/ Years 4 to 7</td>
<td>Researcher developed CBT program</td>
<td>Social Integration Emotional Intelligence Depression Anxiety Symptoms</td>
</tr>
<tr>
<td>Mira-Galvañ &amp; Gilar-Corbi (2020) [Spain]</td>
<td>Quasi-experiment, pre-test/ post-test (non-equivalent control group)</td>
<td>86</td>
<td>9 to 12/ Years 4 to 6</td>
<td>OKAPI (emotional education program)</td>
<td>Social-Emotional Functioning Academic Performance</td>
</tr>
<tr>
<td>Panayiotou et al. (2019b) [UK--England]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>5,218</td>
<td>7 to 9/Years 3 and 4</td>
<td>Providing Alternative Thinking Strategies (PATHS)</td>
<td>Social-Emotional Competence School Connectedness Mental Health Difficulties Academic Performance</td>
</tr>
<tr>
<td>Papisca et al. (2019) [Poland]</td>
<td>Quasi-experiment, pre-test/ post-test</td>
<td>339</td>
<td>8 to 9/Year 4</td>
<td>EMOScope</td>
<td>Emotional Awareness Understanding human behavior in an interactive context Prosocial Behavior and Problem Behavior</td>
</tr>
<tr>
<td>Study Authors</td>
<td>Study Design</td>
<td>N</td>
<td>Age Range</td>
<td>Intervention Description</td>
<td>Outcome Measures</td>
</tr>
<tr>
<td>-------------------------------</td>
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<td>------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pophillat et al. (2016)</td>
<td>Randomized Controlled Trial</td>
<td>206</td>
<td>6 to 9/Years 2 to 4</td>
<td>Aussie Optimism Program: Feelings and Friends (AOP-FF)</td>
<td>Emotional Knowledge (Social-Emotional Competence)</td>
</tr>
<tr>
<td>Raimundo et al. (2013)</td>
<td>Quasi-experiment</td>
<td>318</td>
<td>9 to 10/Year 5</td>
<td>Slowly but Steadily</td>
<td>Social Competence (Social-Emotional Competence) Anxiety (Psychosocial Adjustment) Aggressiveness (Psychosocial Adjustment) Social Problems (Psychosocial Adjustment)</td>
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<tr>
<td>Rooney et al. (2013a)</td>
<td>Nested cohort (with 1 random factor and 2 fixed factors)</td>
<td>910</td>
<td>9 to 10/Year 5</td>
<td>Aussie Optimism Program Positive Thinking Skills (AOP - PTS)</td>
<td>Depression Anxiety Symptoms Attributional Styles Internalizing/Externalizing Problems</td>
</tr>
<tr>
<td>Rooney et al. (2013b)</td>
<td>Longitudinal Randomized Controlled Trial</td>
<td>910</td>
<td>9 to 10/Year 5</td>
<td>Aussie Optimism Program Positive Thinking Skills (AOP - PTS)</td>
<td>Depression Anxiety Symptoms Attributional Styles Internalizing Disorders Suicidal Ideation and Behavior Internalizing/Externalizing Problems at Home</td>
</tr>
<tr>
<td>Santos &amp; Langill (2020)</td>
<td>Stratified Randomized Controlled Trial (no treatment control)</td>
<td>98</td>
<td>7 to 9/Year 4</td>
<td>MindMasters 2</td>
<td>Self-perception Ability to name, recognize, and manage emotions</td>
</tr>
<tr>
<td>Schonert-Reichl &amp; Lawlor (2010)</td>
<td>Quasi-experiment</td>
<td>246</td>
<td>9 to 13/Years 5 to 7</td>
<td>MindUP</td>
<td>Optimism School and General Self-Concept Positive and Negative Emotions Social-emotional Competence</td>
</tr>
<tr>
<td>Schonert-Reichl et al. (2012)</td>
<td>Quasi-experiment</td>
<td>585</td>
<td>8 to 12/Years 5 to 8</td>
<td>Roots of Empathy (RoE)</td>
<td>Empathic Concern and Perspective-taking Prosocial and Aggressive/Antisocial Behaviors</td>
</tr>
<tr>
<td>Study Authors/Year</td>
<td>Design &amp; Country</td>
<td>Sample Size</td>
<td>Age Range</td>
<td>Intervention</td>
<td>Outcomes</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------</td>
<td>-------------</td>
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</tr>
<tr>
<td>Schonert-Reichl et al. (2015) [Canada]</td>
<td>Randomized Controlled Trial</td>
<td>705</td>
<td>9 to 11/Years 5 and 6</td>
<td>Mindfulness Education (ME)</td>
<td>Cognitive Control/Executive Function (EF), Stress Levels/Physiology, Empathy and Perspective-taking, Optimism, Emotional Control, School Self-Concept, Level of Depressive Symptoms (Well-being), Mindfulness, Social Responsibility, Prosociality, Peer Acceptance, Positive School Outcomes (Academic)</td>
</tr>
<tr>
<td>Schonfeld et al. (2015) [USA]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>300</td>
<td>8 to 12/Years 4 to 7</td>
<td>Providing Alternative Thinking Strategies (PATHS)</td>
<td>Academic Achievement</td>
</tr>
<tr>
<td>Sibinga et al. (2016) [USA]</td>
<td>Randomized Controlled Trial</td>
<td>10 to 14/Years 6 to 9</td>
<td>Mindfulness-Based Stress Reduction (MBSR) program, adapted</td>
<td>Psychological Symptoms, Mood and Emotion Regulation, Coping, Post-traumatic Symptoms</td>
<td></td>
</tr>
<tr>
<td>Stallard et al. (2014) [UK--England]</td>
<td>Cluster Randomized Controlled Trial</td>
<td>1,448</td>
<td>9 to 10/Year 5</td>
<td>FRIENDS for Life</td>
<td>Symptoms of Anxiety and Low Mood, Worry, Self-worth/acceptance, Extent of Bullying, Life Satisfaction, Presence of an emotional or behavioral problem, chronicity, distress, social impairment, and burden</td>
</tr>
<tr>
<td>Terjestam et al. (2016) [Sweden]</td>
<td>Pre-test/post-test (with control)</td>
<td>358</td>
<td>10 to 14/Years 6, 8, and 9</td>
<td>COMPAS (Compassion and Attention in the Schools)</td>
<td>Effortful Control, Wellbeing at School, Psychological Distress Stress, Peer Relations/Problems</td>
</tr>
<tr>
<td>Viguer et al. (2017) [Spain]</td>
<td>Pre-test/post-test (with control)</td>
<td>228</td>
<td>10 to 11/Year 6</td>
<td>EDI Program</td>
<td>Emotional Intelligence</td>
</tr>
<tr>
<td>Authors</td>
<td>Design</td>
<td>Sample Size</td>
<td>Age Range</td>
<td>Intervention</td>
<td>Outcomes</td>
</tr>
<tr>
<td>-------------------------</td>
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<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>von Marees &amp; Petermann</td>
<td>Quasi-experiment</td>
<td>372</td>
<td>6 to 10/ Years 2 to 5</td>
<td>Verhaltenstraining in der Grundschule</td>
<td>Social-emotional Problems, Aggression/Victimization, Social-emotional Competence, Social Behavior</td>
</tr>
<tr>
<td>(2010) [Germany]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waldemar et al.</td>
<td>Pre-test/post-test (waitlist control)</td>
<td>132</td>
<td>10 to 11/ Year 6</td>
<td>Mindfulness and Social-Emotional Learning (MSEL)</td>
<td>Moral Disengagement</td>
</tr>
<tr>
<td>(2016) [Brazil]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wang &amp; Goldberg</td>
<td>Quasi-experiment</td>
<td>84</td>
<td>8 to 9/Year 4</td>
<td>Bullying Literature Project (BLP)-Moral Disengagement (MD)</td>
<td>Bullying and Victimization, Prosocial Behavior, Peer Friendships, Social-emotional Assets, Anxiety</td>
</tr>
<tr>
<td>(2017) [USA]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yamamoto et al.</td>
<td>Quasi-experiment, 2 (group) x 2 (time) between-subjects</td>
<td>125</td>
<td>Year 5</td>
<td>You Can Do It! (YCDI) Education Program</td>
<td>Social Support Resilience</td>
</tr>
<tr>
<td>(2017) [Japan]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mapping SEL Program Components

The mapping process indicated that the most frequently targeted resilience facets by SEL programs (i.e., in at least half) were the protective factors of: “Self-efficacy/Autonomy” (31 programs), “Social Competence” (29 programs), “Coping Skills” (29 programs), “Cognitive Competence” (26 programs), “Problem-Solving (Skills)” (24 programs), and “Self-Esteem” (18 programs).

Table 4: Frequency Table of SEL Program Mapping onto Protective Factors of Resilience Framework

<table>
<thead>
<tr>
<th>Factor</th>
<th>Academic Competence</th>
<th>Achievement Motivation</th>
<th>Cognitive Competence</th>
<th>Cooperation &amp; Communication</th>
<th>Coping Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of studies</td>
<td>0</td>
<td>2</td>
<td>26</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>Factor</td>
<td>Family/Peer Relationships</td>
<td>Life Satisfaction</td>
<td>Optimism</td>
<td>Positive Affect</td>
<td>Problem-Solving (Skills)</td>
</tr>
<tr>
<td>Number of studies</td>
<td>8</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Factor</td>
<td>Self-efficacy/autonomy</td>
<td>Self-esteem</td>
<td>Sense of Purpose</td>
<td>Social Competence</td>
<td>Social Support</td>
</tr>
<tr>
<td>Number of studies</td>
<td>31</td>
<td>18</td>
<td>14</td>
<td>29</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 5: Frequency Table of SEL Program Mapping onto Risk Factors of Resilience Framework

<table>
<thead>
<tr>
<th>Factor</th>
<th>Anxiety</th>
<th>Depression</th>
<th>Negative Affect</th>
<th>Perceived Stress</th>
<th>PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of SEL programs</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

Mapping Student Outcome Measures

Facets of resilience most often assessed by included intervention studies (i.e., in at least half) were the protective factors of “Social Competence” (39 studies), “Self-efficacy/autonomy” (31 programs), “Coping Skills” (24 studies), and the risk factor of “Negative Affect” (27 studies).

Table 6: Summary of Assessment Frequency Mapping on Protective Factors of Resilience Framework

<table>
<thead>
<tr>
<th>Factor</th>
<th>Academic Competence</th>
<th>Achievement Motivation</th>
<th>Cognitive Competence</th>
<th>Cooperation &amp; Communication</th>
<th>Coping Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of studies</td>
<td>9</td>
<td>9</td>
<td>20</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Factor Family/Peer Relationships</td>
<td>Life Satisfaction</td>
<td>Optimism</td>
<td>Positive Affect</td>
<td>Problem-Solving (Skills)</td>
<td></td>
</tr>
<tr>
<td>Number of studies</td>
<td>15</td>
<td>4</td>
<td>6</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Factor Self-efficacy/autonomy</td>
<td>Self-esteem</td>
<td>Sense of Purpose</td>
<td>Social Competence</td>
<td>Social Support</td>
<td></td>
</tr>
<tr>
<td>Number of studies</td>
<td>31</td>
<td>12</td>
<td>6</td>
<td>39</td>
<td>6</td>
</tr>
</tbody>
</table>
Table 7: Summary of Assessment Frequency Mapping onto Risk Factors of Resilience Framework

<table>
<thead>
<tr>
<th>Factor</th>
<th>Anxiety</th>
<th>Depression</th>
<th>Negative Affect</th>
<th>Perceived Stress</th>
<th>PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of studies</td>
<td>12</td>
<td>11</td>
<td>27</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussion

This systematic review adds to the precedent of framing social-emotional skill development in education through the lens of resilience. The 34 SEL programs used in intervention studies included in this review primarily focused on promoting self-efficacy as well as coping skills, both social and cognitive competence, problem-solving skills, and self-esteem in students. It should be noted that all frequently targeted resilience facets by SEL programs were protective factors that can be broadly divided into a) skills that relate to individual self-regulation and b) those that support interaction. Outcome measures related to resilience most often assessed student negative affect in addition to protective factors of social competence, self-efficacy, and coping skills.

Overall, SEL programs in their curriculum targeted protective factors as opposed to risk factors. This trend is not surprising when considering the logic that SEL programs would emphasize protective factors through intervention to reduce the impact of risk factors (captured by outcome measures). In line with the common protective factors targeted by SEL programs in this review, previous literature on universal school-based resilience promotion has found that programs often focus on coping strategies, social competency, prosocial behavior, cultural identity, as well as perceptions of the self, the external world, and of the future (Brownlee et al., 2013). The multitude and variety of protective factors targeted by SEL programs is also in line with resilience research that construes resilience as multifactorial. For example, a systematic review of resilience intervention studies with child mental health outcome measures conducted by Dray et al. (2017) only included interventions that targeted at least three protective factors as this has been found to be the minimum number needed to have meaningful change or adaptation post intervention.

Although promising to support the unification of SEL and resilience-focused literature in student skill development, the findings of this systematic review do indicate the need for further refinement of how constructs are organized within the presented resilience framework. Specifically, the current resilience protective factors included in the framework could be reconfigured as follows so that some are nested, but would need to be empirically verified:

- Cognitive Competence
- Problem-solving (skills)
- Academic Competence
- Academic Motivation
- Life Satisfaction
- Positive Affect
- Optimism
- Self-efficacy/autonomy
- Coping Skills
- Self-esteem
- Sense of Purpose
- Social Competence
- Cooperation & Communication
- Social Support
- Family/Peer Relationships
It should also be noted that the systematic review describes SEL intervention studies that had in-person whole-classroom delivery. However, the current situation in education is one of disruption with a significant dependence on online teaching. When considering how SEL in education can promote student resilience for future challenges, one must acknowledge what will most certainly impact students and the global stage for years to come: the COVID-19 pandemic.

**Moving SEL and Resilience Online**

Interpersonal relationship formation is at the core of facilitating resilience in education whether between student and teacher or amongst classmates (Field et al., 2012; Furrer et al., 2014; Frisby et al., 2020). Whether learning takes places in-person or online, a central focus to promote resilience in education can remain on that of developing agency, connectedness, and a “resilient” mindset (Yeager & Dweck, 2012) by facilitating discussion around emotional experience and processing (i.e., coping skills).

As discussed earlier, a recurrent theme for defining constructs tied to resilience is the perspective of the individual towards themselves as well as to identified sources of support. Even more so in a situation of uncertainty such as that resulting from the pandemic, the individual’s sense of control is put under much strain. Organizing lessons in such a way that allows for students to reharness a degree of agency and consequently, some sense of control (Bandura, 2001), can increase engagement and have a potentially stabilizing effect against the uncertainty experienced (Reeve & Tseng, 2011).

Resilience-focused programs have been found to be particularly effective in producing positive impacts on student ability to manage stress when they are delivered by teachers and allow for adaptability in program implementation (Fenwick-Smith et al., 2018). Of equal importance then to creating a “resilient” classroom is to also empower teachers with SEL professional development so that they can a) discuss coping strategies and emotions with the aim of normalizing them for students, and b) hold conversations about internal states that can establish causal connections between situations and resulting emotions—found to be an effective way to promote emotion understanding in children based on previous training studies (e.g., Tenenbaum et al., 2008).

Some examples to promote agency in learning could include a greater emphasis on students leading or facilitating group discussion, the incorporation of transmedia wherein students create and share narratives across media (Hovious et al., 2018), and if online, an increased use of breakout rooms to make space for more meaningful interaction. However, agency when understood in the sense of independence in learning may be more readily applied and easier to translate to online teaching with secondary school students as opposed to primary school students. Although students in middle childhood are capable of independence in both academic and group work, an important degree of pedagogic scaffolding is still needed to facilitate learning (Shwartz & Bakker, 1999; Wood et al., 1976) and to promote such independence (Holton & Clarke, 2006). Emotional scaffolding (Rosiek, 2003) presents a particular form of scaffolding especially emphasized in early childhood education (Park et al., 2020), but could be beneficial to students of all ages. As is the case for instruction in traditional academic subjects, any promotion of social-emotional or resilience-based skill development in an online space must be developmentally appropriate for it to be effective (Pica, 2015).

**Conclusion**

To the author’s knowledge, this systematic review presents the first attempt to synthesize a broad theoretical framework for resilience drawing on multiple research disciplines that was then applied to SEL programs delivered universally in primary schools across middle childhood. Future research on resilience and SEL in schools can further refine this framework so that it is empirically based, perhaps even to the extent of creating a factor model to understand how social-emotional development is specifically supported in education settings so as to promote dialogue among researchers from related education fields. Applying a lens of resilience to SEL is a way to reframe what schools already do to support social-emotional development, transforming thus the school into a protective factor in itself (Morrison et al., 2006). As we transition towards processing the experience of COVID-19, the aftermath on education, and how it is delivered, schools are well-placed via SEL and other resilience-based programming to potentially serve as a buffer to adversity experienced by student communities and to promote the student mindset that they can overcome challenges the future holds. Continued research on interpersonal relationship formation over digital space and classroom dynamics in an online form is needed to further explore how resilience can manifest in education for the modern technological age.
References


Steering in a changing context: Attitudinal strategy of recent young graduates in transition from university through early career in digital economy sector in China

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Abstract

The development of digital economy and its impacts on labor market is an emerging issue. While the affected general labor market has received attention, the picture of young graduates in this context remains unknown, especially considering their vital transition from university through early career. Existing studies on transition to workplace focus more on immediate destinations of graduates' first employment. Whereas recent young graduates are found to change jobs frequently at the beginning of career, the first destination may not present a round picture. Drawing on 38 semi-structured interviews with participants who were out of university for three to five years and were working in digital economy sector in Hangzhou, this research employs a retrospective approach to ask participants their journey in the labor market from graduation onwards. Two questions are explored: 1) what are graduates' attitudes toward the employment context in digital economy sector in China? 2) How do graduates navigate their transition from university through early career in this context? Thematic analysis with an inductive coding approach is applied to this qualitative research. It argues that graduates tend to develop an attitudinal strategy to navigate their transition to early career in digital economy sector. The attitudinal strategy involves their views toward digital economy sector as a challenging but promising context and their dispositions to empower individual agency to learn from changes and learn for changes.

Keywords

Early career transition, graduates' attitudes, digital economy, China
Introduction

The development of digital technology has received global concern as it is transforming the society and economy profoundly (OECD 2017; Kuhn et. al. 2018), and it is argued to be a vital driver for the fourth industrial revolution (Ruan. et. al. 2017). As stated, we are in the midst of the transition towards a digital economy and society (OECD 2017, p. 3). Within this context of a digital economy and society, landscape of labor market is also experiencing striking transformations (Scholz & Trebor 2017; Graham et al. 2017), for example, new forms of employment, new occupations, changing requirements of skills, etc (Peña-López, 2016; Spiezia, 2017). Moreover, digital technology is transforming employment with more jobs in general sectors being permeated rather than only within the ICT sector (OECD 2017). These emerging transformations in the labor market can impact young graduates dramatically regarding their transition university through early career as young graduates contribute to a pivotal group of the working population in the labor market.

China is also witnessing the development towards digital economy (Zhang 2019; Wu 2021; Ma et.al. 2021), with the second largest scale of digital economy and the highest growing rate of the proportion of digital economy in whole GDP among G20 countries in 2017 (CAICT 2017, p. 7). Digital economy has taken up more than 30% whole GDP of China since from 2017 (CAICT 2018, p. 2; 2021, p. 6). China has a considerable population working in digital economy sector. The population working in the sector was 171 million, contributing to 22.1% of the whole working population in 2017 (CAICT 2018, p. 29). In 2012, newly employed workers in digital economy contributed to 17% of all newly employed workers and the figure rose to 35.9% and 40.0% in 2016 and 2017 respectively. (CAICT 2018, p. 31). The importance of digital economy on employment is further proved by the ‘The Guideline to Develop Digital Economy, Stabilize and Expand employment’ published in 2018. “By 2025, the digital economy sector will be a significant channel to absorb employment with a stably expanded scale of digital talents” (Gov, 2018).

As an important work force in the labor market (Tomlinson 2007), young graduates today are notably flowing and flexible in the labor market (Allen & Van der Velden; Calmand et.al. 2011). In China, average number of employers for 2011 graduates within three years of graduation is two (Mycos 2016). Moreover, people born after 1990 have the highest rate of job moves in China (Zhilian 2016). When the work or environment is not suitable for their development or aspiration, young people prone to make work change (Ruan et. al. 2017). These findings inspire us with a possible tendency that young graduates are becoming mobile in the labor market, especially in digital economy sector which is argued to be a fast-changing and unstable context.

Despite the wide attention received by global and national academics in terms of the overall impact of digital economy on labor market and the changes of labor market, the experience of the group of young graduates and especially the experience of young graduates as an individual has been rarely examined. However, current changes in the labor market can have profound impact on young graduates who are in their early careers. Thus, in the era of digital economy and considering this complex of transforming labor market and the changing tendency of young graduates, it is worthy of exploring the attitudes of young graduates towards this complex context regarding their transition to workplace.

However, since young graduates are found to change jobs frequently, it is less reliable to only focus on their first employment. Drawing on 38 interviews with young graduates who were out of university for three to five years, this research is based on a retrospective approach to explore two questions: 1) what are graduates’ attitudes toward the employment context they experience in digital economy sector in China? 2)How do graduates navigate their transition from university through early career in digital economy sector in China?

Taking Hangzhou as a case city to study, this research argues that graduates are found to have developed an attitudinal strategy to navigate their transition in early career in digital economy sector in China. This attitudinal strategy involves two aspects, the attitudes that regarding digital economy sector and a challenging and promising context for transition and the dispositions that they empower individual agency to learn for changes and learn from changes in order to adapt to and to progress in the sector.
Methodology

This research draws on semi-structured interviews with 38 participants who were out of university for three to five years in 2019 when interviews were conducted in Hangzhou, China. Participants had to be worked in digital economy sector in Hangzhou when being interviewed. 28 participants were employed (or self-employed) in the sector since from their first employment right after graduation. The other ten moved to the sector in later job changes. Most interviews were conducted face to face while a about one fourth were carried online via WeChat depending on the willingness and convenience of participants. WeChat is a popularly used real-time communication social media in China, equivalent to the combination of Twitter and WhatsApp. Snowball sampling was the main strategy to recruit participants, with a complementary approach of social network (a recruitment advertisement was put in the online community of people working in digital economy in Hangzhou).

Subsectors of interviewees cover main domains of digital economy sector, such as online marketing, Internet Finance, digital technology and new fields like AI (artificial intelligence) and Big data. Online marketing sees the most interviewees which is in line with the macro context of digital economy sector in Hangzhou. Participants’ occupations are categorized into five types, product management, operation management, UI design, software development, and administrative positions. These positions are the main work positions in digital economy sector.

Table 1: Information of interviewees

<table>
<thead>
<tr>
<th>Attribute Sub-attribute</th>
<th>Gender</th>
<th>Year of graduation</th>
<th>Type of university</th>
<th>Times of employment</th>
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<td>2014: 8</td>
<td>‘985’: 19</td>
<td>3+: 7</td>
</tr>
<tr>
<td></td>
<td>male 24</td>
<td>2015: 13</td>
<td>‘211’: 5</td>
<td>3: 13</td>
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<tr>
<td></td>
<td></td>
<td>2016: 17</td>
<td>other: 14</td>
<td>2: 15</td>
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<td></td>
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<td>1: 3</td>
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</tbody>
</table>

Interviews were conducted in Hangzhou, China between June and September 2019, lasting from around 30 minutes to over 90 minutes and the average length was around 45-50 minutes. It was designed as semi-structured interviews with a revised interview schedule based on pilot interviews conducted in January 2019. Interviews were conducted with each participant individually. Participants were asked to recall their journey from graduation till the time being interviewed, guided by questions about their experience in each work (or not in employment), their consideration for decision-making, their attitudes towards their transition experience, etc.

Hangzhou is selected as the case city is mainly because of its well-known position as one of the emerging centers of digital economy in China with the most famous companies, for example, Alibaba and Wang Yi. Hangzhou ranked the fifth among all cities in China in terms of the amount of digital talents in 2017 (Chen & Ma 2017, p. 11). The report by Tsinghua and LinkedIn finds that Hangzhou attracted more talents from Beijing than Beijing inversing. Hangzhou has become a new attracting destination for young graduates compared to other traditional appealing cities, like Beijing, Shanghai and Guangzhou.

Since all interviews were conducted in Chinese, they were transcribed and analyzed in Chinese in order to minimize researcher's bias and distortion in translating. All interviews were audio-recorded. Anonymous recordings of interviews were first transcribed verbatim by software ‘Xun Fei’ (讯飞听见). Thematic Analysis, which is widely used for identifying and analyzing the most prevalent patterns of meaning in a data set (Saldaña 2013; Clark & Braun 2014; Braun & Clark 2019), was then applied with open coding as the first round followed by pattern coding to frame emerging categories (Saldaña 2013). The patterns of attitudes and strategies in coping with individual transition situation emerged from the six-step coding process (Clark & Braun 2014).
Discussion on findings: attitudinal strategies of young graduates in steering their way through early career transition in digital economy sector

The findings are emerged from an inductive thematic coding process (Saldaña 2013). Graduates’ views and opinions about digital economy sector, such as their feelings, characteristics of the sector, are categorized as attitudes towards the sector. Graduates’ response to their strategies to cope with various situation, are categorized as developed dispositions.

First, graduates view digital economy sector as a challenging and promising context for transition from university through early career. Then, they develop dispositions of exercising individual agency to learn from changes and learn for changes in order to steer their way in digital economy sector. The two aspects that constitute graduates’ attitudinal strategy in mediate their transition in the sector will be illustrated in turn.

Attitude: a challenging and promising transition context in digital economy sector

As a pure qualitative study, attitudes of participants are drawn on inductive coding of the views posed by graduates when they talked about their feelings and views of digital economy sector. Basically, their attitudes come from three aspects of responses in interview, their reason to choose the sector, their self-reported feelings in the sector, and the answer to whether they view the sector having more risk or opportunity.

Attitude is usually referred to as a term that can ‘only be used with reference to a person’s location on the affective dimension vis-a-vis a given object’ (Fishbein & Ajzen 1972, p. 494). However, the uniqueness of this study is that graduates’ attitudes toward digital economy sector cannot be located on a bipolar dimension as almost all participant report both sides of attitudes. In this case, this study chooses to discuss attitudes of participants with a thematic approach on two major themes of attitudes, a sector of risks and challenges, a fast-changing nature and its affiliated opportunities.

Attitude 1: a sector of risks and challenges

The current era of world has been widely argued as a ‘risk society’ (Beck et.al. 1994) in which individuals are undertaking risks in an unstable and uncertain context (Beck et.al. 1994). In this research, it is found that young graduates view digital economy sector as a context of risks where they see striking challenges. Three aspects are reported to be blamed for this challenging context, the risky nature of digital economy sector, uncertain employment environment and age-crisis in competition. They are, however, three interlocked aspects which lead to the risky and challenging experience of young graduates in transition to early career.

Wei is a representative participant who transfers to digital economy sector from a traditional sector and has experienced both start-ups and mature companies in digital economy sector. His transition trajectory into early career started from working in a state-owned bank in Shanghai after graduation, then he moved to a well-known start-up in digital economy sector in Shanghai, and finally moved to a well-known leading company in digital economy sector in Hangzhou. Two aspects of risks are blamed for his strong sense of risky in the sector, the risk of macro environment of the sector and the risk of individual’s survival in competition in the sector.

It is highly risky in the first place. On one aspect, risks come from the macro environment... bubbles (泡沫, Pao Mo2) in this sector are huge. For example, I done other people's three-years-work in just one year, but I also witnessed the company rising from 1 to 100 then falling from 100 to 1 in the same year.

Then (career) cycle is short (in this sector). Risks also comes from whether the individual can maintain competence in the sector. Those who stay in one job for ten or twenty years, like the father’s generation, don’t exist at all today...The cruelty of digital economy sector is that it speeds up a person's (career) cycle... I could be eliminated and replaced by younger people if I did not have essential improvement during this year.
Two traits of digital economy sector result in graduates’ strong sense of risky. First, the employment environment (the company) is unstable due to the risky nature (bubble) of digital economy sector. Besides, fast iteration of individual career cycle and challenge of being replaced by younger people aggravate the sense of risky. An important point that should be stated here is that this feeling of risky was experienced after Wei has entered the digital economy sector. “I did not feel risky in my first work in bank, but I have felt strong sense of risky since my second employment (first work in digital economy sector).

If the strong feeling of risky of Wei is somehow a result of his change from a traditional sector to digital economy sector, then the other category of participants who have been worked in digital economy sector from the start of career provide similar opinion. Feelings of risky in transition in digital economy sector mainly comes from the risky nature of the sector and challenge from fierce competition.

Cheng is a male graduate who comes from an elite university in east China and has been employed in different companies in digital economy sector in Hangzhou since graduation. Cheng represents those young graduates who entering the sector for an emerging hotspot and has witnessed dramatic changes, which leads to an unsecured feeling for early career transition. Cheng chooses to enter the sector for his interests in the field of deep learning. In Cheng's own words, this was a new filed which was not a major attention in the sector when he chose his first employment in 2015. However, Cheng witnessed a sharp expansion of deep learning just one year after, which he thought was leading his chosen career to be risky.

The biggest impact was in between end of 2016 and 2017 when AI was seething hyped in the field of deep learning, bringing more fierce competition. Quite many graduates entered this field...notably you could meet more competition. There can be more job opportunities in front of you, but you will consider whether they are bubbles or not. Whether they were of true value or not? Before [the field was hyped], there was no worry on these risks, you only need to do your job.

The risk is a result of a hyped development of his field, which is another way to show the risky nature of digital economy sector. Unexpected development of the sector mainly poses three aspects of risk, unexpected fierce competition, changing value of previous choice, and uncertainty with career choices.

To combine the two cases, there are two shared views that contribute to an attitude of regarding digital economy sector as a challenging context. First, the risky nature of digital economy sector sets a risky environment for young graduates regarding their transition in the sector, e.g. unstable context, unsecured choice, etc. Moreover, individual also faces risks from condensed competition, especially from younger people. As mentioned by both cases, the landscape of competition updates quite fast. There can be substantial or even subversive risks bring by iteration of younger workforce.

Attitude 2: changes, changes, changes

Almost every participant mentions the sector as a sector of changes. This finding benefits from the retrospective approach of this study since graduates report their attitudes based on a long-running experience. In this section, ‘change’ is argued to be the core nature of digital economy sector, which acts as a two-sided bridging role in affecting attitudes of young graduates. On one hand, the changing nature of digital economy sector is criticized as the underpinning reason for the risky and challenging views discussed in previous section. On the other hand, the changing nature of the sector is also a merit for which young graduates’ favor for it. Changes involves three perspectives in this context, changing of the sector, changing of young graduates in the sector, and changes of opportunities.

Changing nature of digital economy sector is, in the first place, is criticized as the fundamental reason for the risky attitudes discussed in previous section. Fast changing of the sector brings vital requirements to young graduates to catch up with its changes, otherwise young graduates can face risk of being replaced. This pressure of keeping up with the changing context is found to be a predominant factor that drives young graduates in early career transition.
Chao is a male graduate from a common university in Hangzhou and has been worked in digital economy sector after graduating in 2016. His trajectory of transition to early career sees a representative journey of many graduates working on the position of programr. Chao first went to another big city not far from Hangzhou working as a programr in a big company, then he moved to a well-known company in digital economy sector in Hangzhou, and his work position changed from a programr to product manager. As reported by Chao, different work positions enable him to experience the sector more comprehensively. He views digital economy sector as a highly stressful context due to its fast-changing and updating in terms of requirements and competition.

There is pressure, and it is in fact great pressure. In this sector, to be honest, everyone is diligent and works very hard. You can feel other people are progressing. If you have no quantitative improvement and substantial leap in one or two years, it is a very scary thing. Comparing to other sectors, digital economy sector is indeed very stressful.

According to Chao, pressure comes from his uncertain position in a changing competitive environment, which is a question of “forging ahead or falling behind” in a context that everyone runs forward. The changing competition is a result of constant renewal of the sector. When explaining why there is higher pressure in digital economy sector than in others, Chao puts the blame on fast updating of the sector. “It updates too fast. The first reason is its fast-changing.” This changing nature of the sector not only put young graduates in a constantly changing competition, but also brings changing requirements of skills to catch up with updates in order to avoid being eliminated. The latter argument is different from the former one which poses challenge to maintain a competitive position in a group of hard-working and progressing employees. The latter argument is a further point that emphasizes the risk facing by individual.

In addition, there are many new technologies come out, and some may be revolutionary changes. AI, for instance, is a further development based on big data. This brings great pressure. It means that you must keep up with these changes and transform your whole algorithms from big data to AI. This is very stressful because it can be very troublesome for you if you could not keep up... Especially for technological position, you can only wait to die if you are unwilling to follow up with new changes.

Changing as the core nature of digital economy sector is witnessed and understood by young graduates according to their continuous experiences in the sector rather than a short or one-off employment. This retrospective approach enables exploration of young graduates’ changes in their attitudes in line with the changing context. Besides previous discussion that views the sector as fast-changing, another point states that the sector is constantly changing. A thought-provoking opinion comes up with Dou who states that “changing is the only thing that has not changed of this sector”.

Dou is a female graduate from a university in west China. She started her career with setting up an online store on Taobao, then she gave up and moved to Hangzhou. In her five years after graduation, Dou had been employed in three different companies in digital economy sector in Hangzhou. According to her experiences in the sector, Dou reports that the sector, as an employment context, is changing every year.

Changes happen every year regarding the working environment. However, later you can find out that there is in fact no change...by the statement of ‘no change’, I mean there are new changes happen all the time and you always have to learn new things and to face new challenges and new situations. Change is the only thing that has not changed.
The two aspects discussed above, changes of digital economy sector, and changes of requirements to maintain competence, form a changing outside environment which is reported to be challenging for young graduates. A third change is found at individual level, the changing professional value (or curve) in digital economy sector. This point is mainly emerged from participants' views on the age-crisis they face in the sector. Many participants mention their concern over challenges brought by younger people. A popular saying is the '35 age crisis' which is specially dramatized by the joking of ‘kuai che driver’ (uber driver). The joke says that 'all product manager will go to work as kuai che driver after the age of 35”.

Cha is a female participant and is one the many participants who held a preference to enter digital economy sector from the first employment. Though she did not find a proper chance and had to enter a state-owned company for her first work, it was not long before Cha moved to a well-known company in digital economy sector. Then she made another change to join her friends for entrepreneurship in the sector. Cha raises an opinion of a fluctuating curve of professional value in digital economy sector.

It is definitely stressful because it is uncertain...In fact, in digital economy sector, your future value is diminishing if you cannot fight to a management position. I mean the value curve in this sector rises in the earlier stage then descends, and finally reach a stable status. It is different to sectors like medicine in which professional value increases with growing working time. Especially for females who will face marriage and maternity at the age of thirty or so, their professional value will definitely decline.

Above attitudes of changes in (of) digital economy sector are mainly regarded as negative sides of the sector. However, changes are also recognized as beneficial for young graduates, which is argued to provide more possibilities of opportunities. If there is a two-poles scale to position participants' attitudes toward changes, then most participants will locate themselves closer to opportunities rather than risks. This positive view toward changes in digital economy sector forms their attitude that regards the sector as a promising context for early career transition especially for young graduates. Cheng, mentioned earlier in section 3.1.1 on risks, considers the changing nature of digital economy sector as more beneficial than harmful. When Cheng reports that hyped development of the sector results in his feeling of risky, he still stands on the opportunity side.

I think it as more positive than negative. Because if the whole sector is progressing, there will be more opportunities, especially more opportunities at the top.

Seeking for opportunities from changes is likely to be a pivotal rationale that drives young graduates' navigation of early career transition in digital economy sector. The changing nature of the sector means less structured boundaries which can restrict or detriment young graduate's chance of opportunities. Xiao, a male graduate who has been employed in two big names in digital economy sector in Hangzhou, raises this significant opinion that changes can be opportunities for young people especially.

I think it is a good thing that there are changes. Because only when there are changes can there have opportunities. If there is no change in the sector, it actually means that there is almost no opportunity for young people. Young people have many opportunities now, so I think it is good.

What opportunities can be brought by changes? The answer can include several benefits that young graduates see. For instance, more choices, more possibility of recognition, chances to try, and so forth. All these benefits are significant for young graduates in transition through early career. Take choice as an example, several participants mention the point that changes come with new companies, new occupations and new positions.
Disposition: individual agency, learning from and learning for changes

Viewing digital economy sector as a challenging and promising context for transition through early career, young graduates are found to have developed corresponding dispositions in order to navigate their way in this context. Disposition refers to the tendency (Maton 2014) of young graduates to respond to their situation in transition into early career in digital economy sector.

Empowering individual agency

Empowering individual agency is a disposition developed in line with individualized risk, challenge and opportunity in digital economy sector. As has been discussed earlier, young graduates are confronted by both risks, challenges and opportunities. In this research, it is found that whether the challenging risks can be transferred to opportunities largely depends on whether young graduates can exercise individual agency to deal with their challenging situation in transition.

Argued by Beck, individualization means that each person's biography is placed in his or her own hands (Beck 1992), thus the significance is put on individual achievement since individual will have to ‘pay for’ the consequences of decisions (Beck, 1992). Empowering individual agency in face of individualized risk is a gradually developed disposition rather than a transient feeling. This development of disposition comes from graduates’ own experiences and their witness of other people in digital economy sector. As realized by young graduates, there are always people that can do well in any circumstances, so it is the individual who can navigate and who should take responsibility of his/her transition experience.

Dou, the female participant mentioned earlier who thinks that “changing nature of the sector is the only thing that has not changed”, recognizes the individualized challenging context and the pivotal role of individual in this process.

There are still many opportunities in unpromising situations. It depends on how you cope with it. There are some friends who are facing layoffs, but there are also friends who have achieved new development. Then you can gradually realize that opportunities and risks coexist. In every circumstance and situation, there are those who do well and those who do not. When you realize this, there is no need to worry about because it only depends on how you behave. The outside environment is changing all the time, and you yourself are the only point that you can manage.

Empowering individual agency is of extraordinary significance for young graduates in digital economy sector due to uncertainty in its nature. When considering the fluctuant development of digital economy sector that has been experienced and witnessed by themselves, some graduates have recognized that the core patron for transition in this changing sector is the individual him(her)self. As mentioned by Xiao, the male graduate discussed earlier in viewing digital economy sector as more opportunity than risk, thinks that individual is the key for opportunity in a changing environment.

[fluctuations of the sector] can certainly impact [on individual experience] ...but this impact is not the main factor. It is more about individual ability. It is you that is the main factor. There is no sense to say which of the two platforms (the two companies he has been worked in) is better. The core point is your performance. If both platforms collapsed and there were better companies emerged, it is your own ability that decides whether you can have the opportunity to make choices.
Learning and keep learning

Acknowledging the significance of empowering individual agency, a further disposition that is found to be a core merit of young graduates in navigating their trajectory in the challenging and promising sector is to employ learning as a key strategy. Learning is regarded as a disposition rather than a practice in this paper because learning is an attitudinal tendency of response. Participants also gave insightful stories of how they conduct learning in practice, but this is not the focus of this paper. The focus here is their developed disposition of learning that can guide their later practice of learning.

Having formed the attitude that view digital economy sector as a fast-changing and competitive context for early career transition, learning for changes is developed as a vital strategy for young graduates to avoid falling behind and being replaced, and to seek for progressing opportunities. This is reported as a disposition of ‘being prepared’ (居安思危, JU AN SI WEI, thinking of potential risks in a secured condition). Mei, a female participant who has experienced different companies in digital economy sector in Hangzhou, has developed a sense to secure herself in an uncertain environment by keeping learning.

The most important [strategy] is learning. Even in a very stable and relaxed situation in which there is no worry for being unemployed, you have to keep learning, otherwise your skills can definitely fall behind. The key is to be prepared (居安思危) because there is no job that can secure you a ‘iron bowl’ (铁饭碗, Tie Fan Wan, a secured job that will not be laid off). Especially under the fast development of technology, you will lose many future opportunities unless you learn to learn for yourself.

Mei decisively chooses the former one between ‘better development’ and ‘stability’ because she view the disposition of ‘unenterprising’ (不思进取 Bu Si Jin Qu, unwilling to making progress) as very risky in digital economy sector. “The so-called age crisis is not about the age, it is in fact your updating of skills and your improvement... if the person keeps a learning status and grasps the latest technologies, (s)he is unlikely to be eliminated.”

If learning for changes is a key disposition to secure young graduates in an unsecured transition context, then learning from changes is a further disposition to enable learning for changes. As has been discussed, the changing nature of digital economy sector is an underpinning reason for challenging transition experience, it is then reported by young graduates that learning from changes is a way to offset risk. When Mei acknowledges that she has undergone feelings of unstable, upset and anxious, she finds out that “learning from new changes can offset those uncertainties”.

Chao, the male graduate mentioned earlier in discussing the sector as a fast-updating context that brings constant competition and challenge, reports that he has developed a disposition of learning from changes in order to catch up with changes. In line with his comments on the changing sector, changing requirements and changing competition, Chao states that learning from changes in the sector is a way he finds out to keep up with the changing environment and to maintain his competence to secure himself in face of changing requirements and competition.

[My strategy] is to learn more about the sector... to gain insight into the development of the sector. If you can keep up with the latest changes [of the sector], I do not think you can fall behind. What I do is to update my knowledge from every aspect. There is no other solution. This is the way I find out for myself because only people who understand the sector will not likely to be eliminated.
To summarize, learning from and learning for changes, on one hand, help young graduates to keep up with the changing sector and to avoid being replaced in competition. On the other hand, learning from and learning for changes also aims to enable young graduates to be prepared for opportunities. A further role of learning in this context is to avoid risks while seeking for opportunities since many participants report that risks and opportunities are often two sides of one coin, so it is pivotal to discern opportunities from risks. In a challenging and promising context, graduates have to seek for progress while avoiding being in a risky situation. Learning from changes and learning for changes thus form an disposition to maximize opportunities and to minimize risks.

Conclusion

To answer the first research question on ‘what are graduates’ attitudes toward digital economy sector as a context for their transition’, it is found that graduates regard the sector as a challenging and promising context in which they experience risks and challenges but can have more possibility to seek for opportunities. To answer the second research question on “how do graduates navigate their transition in digital economy sector”, the finding shows that young graduates have developed two dispositions to maximize opportunities and to minimize risks for progressing in the changing sector. Empowering individual agency acts as a fundamental disposition while learning from and learning for changes form a further one. The attitudes and developed corresponding dispositions, frame an attitudinal strategy for young graduates to sustain and to steer their way in transition from university through early career in digital economy sector. This finding echoes to the two perspectives of flexibility of graduate labor market in knowledge economy argued by Calmand et.al. (2011), the precariousness of graduates and the possibility to take advantage of changes. However, Calmand's argument is based on young graduates who have a modest level of job mobility working in a wide range of sectors, which is far different from this study.

This study contributes to understand the rarely examined topic of young graduates' experiences in transition from university through early career in digital economy sector in the Chinese context. Attitudes of graduates and their strategies in this context are barely known in existing studies. The attitudinal strategy identified in this study adds knowledge to academic world as well as policy considerations. This study suggests that it is important to pay attention to the challenging situation faced by young graduates and to provide relevant facilitating policies. Besides its contributions, this study also recognizes its limitations. Though it is based on a respective approach that looks at a relatively long-running experience of young graduates, the findings may not be a final and definite answer to the big question of graduates' attitudes and navigations in transition in digital economy sector. This is due to the fast-changing sector as an external environment and the changing tendency of young graduates as the core agent. Thus, it is worthy of and requires further studying with possibly a larger sample and longer tracking.

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Ethical Statement

This research was approved by the researcher’s affiliated university’s ethics committee. It was conducted with full ethical considerations for participants with information sheet and consent form provided in the recruiting stage prior to interview.

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The building “bricks” of informal STEM education: Narratives of a participatory project on aspirations for development in rural Malaysia

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Abstract

In the mainstream, national development is often defined in terms of economic growth that privileges modernity, urbanization and scientific expertise. The promise of science, technology and innovation in contributing to development is reified through practices in international aid and development (Conway & Waage, 2010; Smith, 2009). In light of this, the “science for development” model (Drori, 1998) has been internalized and reflected in a national focus on science—and recently STEM—education across the Global South in the pursuit of development. Such a trend includes Malaysia, the focus of this paper.

Employing a postcolonial critique that foregrounds the ways of knowing and agency of actors side-lined by the mainstream development discourse (McEwan, 2019), this paper highlights a participatory project on “ecobricks” involving rural young people in one secondary school in Malaysia. Through preparation and participation in a STEM innovation competition organized by a public university—where I served as a their mentor—these young people engaged in enacting their capacity to aspire. As a tool for young people navigating their lives, this is a capacity that can be strengthened through conscious exploration and practice (Appadurai, 2004). Weaving ethnographic fieldnotes and interviews with the young people involved in this competition, I construct narratives of place-based, participatory informal STEM education in a rural context, engaging with Sellar & Gale’s (2011) new “structure of feeling” involving mobility, aspiration and voice. Extending this conceptualization beyond participation in higher education with the Malay concept of rasa (feeling, sensitivity, intuition), I thus portray an educative experience where rural young people grapple with questions of development and the emplaced challenges in their surroundings. Through these narratives, I argue that the future education of young people must (still) attend to the particularities of place and the skills needed to act in/on such places. This calls for modes of education that exercise their capacity to aspire through a participatory spirit, attention to lived experiences and exposure to novel encounters.

Keywords

Aspiration, development, STEM education, informal education, Malaysia
Introduction

As it is conceived of today, mainstream development discourse is largely grounded in economic growth and accumulation of capital to eradicate poverty, the pursuit of modernity, industrialization and urbanization, as well as the expertise of science and technology to produce knowledge on ‘what works’ (Corbett, 2016; Escobar, 2012; Esteva, 1999; Goldin, 2016; Willis & Kumar, 2009). Under the banner of development, science and technology promises to aid the goal of poverty eradication through the fulfilment of fundamental human needs to live a dignified life (Watson et al. 2003). The central role accorded to science and technology in the project of international development is well documented, and subsequently reified through the role of international organizations such as the United Nationals Educational, Scientific and Cultural Organization (UNESCO) and the Organization of Economic Co-operation and Development (OECD) (Conway & Waage, 2010; Schwachula et al., 2014; Smith, 2009). Zooming in on this economic emphasis of development, Drori’s (1998) model of “science for development” subsequently traces the putative link between science education in primary, secondary and tertiary education, the expansion of scientific and technical labor force, and subsequently national economic development. This model thus allows “for the discursive regime of “development” to dominate any discussion of science, science education, and their social role” (Drori, 1998, p. 51).

A fervent belief in the authority of international organizations has spurred many nations in the Global South to channel significant investments towards developing human capital in science and technology, to varying degrees of success. While the Asian Tigers (Hong Kong, Singapore, South Korea and Taiwan) have enjoyed swift economic development, countries in Latin America and Eastern Europe have seen slower economic growth, and in some instances inequalities were exacerbated (Caillods et al., 1996; Smith, 2009). Nevertheless, development aspirations related to science endure in the Global South, influencing targets and the formation of national political imaginations within the globalized world today. In this context, rural communities are often the prime targets of development with its normative goal linked to modernity—“the good life that positions the city as the natural final destination of modernity” (Corbett, 2016, p. 273). Alongside this, the techno-scientific thrust of modernity seeks to supplant traditional and pre-modern worldviews that impede development, framed largely as economic growth (Berthoud, 1990). As societies globally are increasingly characterized as modern and urban, what is left of the rural populace become more acute targets to be worked over by the project of development. In the face of development’s proclivity for urbanization, alternative ideas, hopes and possibilities about the future expressed by rural young people are salient, as they often have limited opportunities to participate in shaping development dialogues directly affecting their lives (OECD, 2018).

Situated within the abovementioned currents of science and development, this paper focuses specifically on rural young people within one context in the Global South as they grapple with science, technology, engineering and mathematics (STEM) education and questions of development in their own community. Employing a postcolonial critique that foregrounds the ways of knowing and agency of actors side-lined by the mainstream development discourse (McEwan, 2019), I describe and reflect on a participatory project involving informal STEM education with rural young people in one Malaysian school. I start by presenting the Malaysian context of development and STEM education, before highlighting the relevant literature on aspirations. This is followed by the description of the methodology related to Youth Participatory Action Research (YPAR) and the associated informal STEM education project. I analyzed my fieldnotes associated with this project alongside data from semi-structured interviews with participating young people in order to present narratives that gesture to young people’s capacity to partake in development dialogues through an educative project. This paper is concluded by placing the insights from this project in dialogue with the two themes of the 1st International Yidan Prize Doctoral Conference: 1) How will education be delivered in the future? 2) What are the skills young people need [in order] to pursue challenges they have?

The Malaysian Context: Development and STEM Education

I first present the country context for this study as a means of situating the participatory informal STEM education project with young people within the broader state discourses of development and STEM education. The central role accorded to science within the narrative of national development is explicitly reflected in the Malaysian case. Consider for example, the following vignette that codifies science in relation to the country’s development aspiration:
In 1991, as part of his national agenda for development known as Vision 2020, Malaysia's fourth Prime Minister Mahathir Mohamad reflected that “[t]here can be no fully developed Malaysia until we have finally overcome the nine central strategic challenges that have confronted us from the moment of our birth as an independent nation...The sixth is the challenge of establishing a scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilisation of the future” (Mohamad, 1991, p. 3)

Related to this aspiration through science, the Malaysian Ministry of Education (MOE) instituted a target of 60 per cent enrolment in science and technology (S&T) stream in upper secondary education compared to 40 per cent in arts stream as part of the National Education Policy since 1970 (60:40 policy) (Zainudin et al., 2015). In contemporary times, a discursive adoption of the nomenclature “STEM” was first introduced in the policy document Malaysia Education Blueprint (MEB) 2013-2025 (Preschool to Post-Secondary Education) (Bunyamin, 2015), and subsequently used to refer to the abovementioned S&T stream. As part of this Blueprint, the section on STEM education included specific attention to informal approaches in order to raise students’ interest in STEM (Ministry of Education Malaysia, 2013). Modalities of informal STEM education include provisions such as hands-on workshops, competitions and exhibitions, career talks and placements (Horwarth & Scott, 2014). I have since explored the expansion of informal approaches to STEM education in Malaysia elsewhere, focusing particularly on the role of non-state providers in this provision (Anuar & Chankseliani, 2021).

The pattern of development in Malaysia is such that the rural population is increasingly being effaced. According to the World Bank (2015), Malaysia is “among the more urbanized countries of East Asia, and its urban population continues to increase rapidly” (p. 99). The share of rural and urban population has been reversed at a remarkable rate, from 26.60% urban in 1960—a few years after its independence from the British—to 77.16% urban in 2020 (World Bank, 2021). Holding the city as the normative goal, rural communities increasingly become marginalized, needing to be worked over by the tide of development. This includes through the modern education of young people in rural places. Within the context of education, rural students in Malaysia persistently underperform their urban counterparts, as evidenced by performance in public examinations (Ministry of Education Malaysia, 2013). Specifically for science education, rural students in Malaysia demonstrate lower enrolment in relation to the 60:40 policy due to teaching strategies not congruent with their needs, as well as the reported lack of motivation and high dropout rate in school (Halim & Mohd Meerah, 2016).

Given such challenges associated with rural young people in relation to science and the broader project of development, how might they be viewed as active agents instead of passive, disempowered receptacles of “development”? I pose this question in relation to Amartya Sen's (1999) argument in his pivotal text Development as Freedom:

The ends and means of development call for placing the perspective of freedom at the centre of the stage. The people have to be seen, in this perspective, as being actively involved—given the opportunity—in shaping their own destiny, [emphasis added] and not just as passive recipients of the fruits of cunning development programs. (p. 53)

With the above recommendation in mind, I now turn to the notion of aspirations as a prism through which young people's perspectives on development can be foregrounded in conjunction with education.
The Capacity to Aspire

In this paper, I attend to development through a postcolonial critique. This entails confronting the power relations in the material and epistemic project of development, problematizing dominant narratives of progress and modernity, and devoting attention to the agency and dignity of the subaltern populations as they encounter the tides of development (Kapoor, 2008; Kumar, 2011). Coupled with Sen's (1999) call for participation in the project of development mentioned in the previous section, here I foreground rural young people's views on development as a means of expanding the development discourse. Thus, I recognize that young people possess varying degrees of agency to shape their lives, rather than merely serving as passive objects of past and present, of history and development (Ansell, 2005). Specifically, I focus on the notion of aspirations among young people about development as they are situated in a particular rural context.

The focus on aspiration here relies on Arjun Appadurai's (2004) conceptualization of “capacity to aspire”, which he describes as navigational, enabling people to chart the path from future, though more privileged members of society navigate such paths more frequently. Nevertheless, within the ambit of inequalities that constrain the marginalized, there is indeed room for strengthening the capacity to aspire. Young people are better able to navigate into the future by utilizing their toolkit of aspirations more frequently, strategically and purposefully (Appadurai, 2004). Zipin et al. (2015) suggests that the “funds of knowledge” approach conceptualized by Moll et al. (1992) encourages students to draw on cultural resources from the home and community in their education.

Building on Appadurai's conception of aspirations, Sellar & Gale (2011) propose a new “structure of feeling” tied to student equity in their work on access to higher education:

Following Appadurai (2004), we align our discussion of capacities with Sen's (1985) work on capabilities and we argue that strengthening capacities to cultivate networks (mobility), shape futures (aspiration) and narrate experiences (voice) increases people's ability to access, benefit from and transform economic goods and social institutions. In turn, this access strengthens the exercise of these capacities. (p. 116)

Here, the three concepts of mobility, aspiration and voice are foregrounded by Sellar & Gale (2011) as capacities with particular salience for understanding and elaborating issues of equity and higher education. In this paper, I take on this new structure of feeling as a point of departure to frame the learnings from a participatory informal STEM education project conducted with rural young people in a Malaysian school. In doing so, I draw on this new structure of feeling as a means of analyzing equity issues beyond higher education. Thus, I focus on the potential of an informal STEM education project developed through a participatory spirit as a way for young people to enact their capacity to aspire, grounded in development concerns tied to their day-to-day lives. Next, I turn to discussing the methodology for this project in relation to YPAR as well as the subsequent analysis of data.

Developing a Participatory Informal STEM Education Project

Within a broader study on rural young people's aspirations, elements of Youth Participatory Action Research (YPAR) were injected in this instance to conceive an informal STEM education project. The conception of this project is aligned with a specific line of inquiry: “How might rural young people enact their capacity to aspire in relation to STEM education and their embeddedness in a rural place?” Grounded in the long tradition of activist-scholars working through the spirit of various critical theories, YPAR centers young peoples’ role and expertise in the production of knowledge about matters that are at the forefront of their day-to-day lives (Mirra et al., 2016). Further to this, Cammarota & Fine (2008) argue that YPAR is “designed to contest and transform systems and institutions to produce greater justice—distributive justice, procedural justice, and what Iris Marion Young calls a justice of recognition, or respect.” (p. 2). Therefore, YPAR as a mode of inquiry pays attention to young people as possessing valid expertise to address concerns of justice in their lives. Recently, the potential of YPAR has been combined with citizen science to produce a conception called Youth Participatory Science (YPS) (Morales-Doyle & Frausto, 2021).
Through its focus on youth applying scientific knowledge to address issues of importance to their local community, YPS offers a tangible framework for incorporating meaningful, relevant education within the confines of the broader education system. In addition, place-based science education also possesses the pedagogical potential to support community development by allow[ing] students to become aware of the challenges of the communities in which they reside, feel more connected to their communities, and so generate technological innovations that are indigenous to the needs on the ground. (Boisselle, 2016, p. 9)

Together, these approaches to research and science education informed the development of the informal STEM education project in order to address the stated research question.

The informal STEM education project in this study was designed in the context of my broader ethnographic immersion in one secondary school in the east coast of Peninsular Malaysia from January to August of 2020. At the beginning of 2020, before the COVID-19 pandemic altered the configuration of education worldwide, I had the opportunity to collaborate with the young people in a school I call Sekolah Luar Bandar (Malay for “Rural School”) in this informal STEM education project. I detail the circumstances that led to this project in my fieldnotes below:

Towards the end of the school day, Cikgu G1 comes to my workspace and shares a letter...about a career exposure event at the local university that includes a competition on innovation for secondary school students. But the competition deadline of 6 February seems tight and as part of the preparation I would also need to factor in the school holidays that coincided with Chinese New Year. (Fieldnotes, 12 January 2020)

Despite my concern about the timeframe for preparation, I viewed the participation in this competition as a potential site for developing the capacity to aspire among young people in this study and to contextualize STEM education in a way that was meaningful to their day-to-day lives. Thus, over the subsequent three weeks leading up to the competition day on 6 February 2020, the project described below was developed. The seven young people participating in this project were 16-year old students placed in the STEM class at the start of the school year, who also participated in the larger study. Drawing inspiration from the Design for Change (2015) framework, I encouraged the young people to brainstorm challenges that they observed in their surrounding environment, starting with the school and the local community. We viewed examples of projects that used this framework, and also walked around the school to observe some of the challenges they had described. I then grouped the challenges together into clusters of potential projects (students’ hang-out space, recycling, agriculture) and the young people then voted on the one they were most keen to take on. I included three criteria in the voting process. The project will need to apply knowledge in STEM, must address a challenge in their daily lives and is practical within the timeframe while being useful for the long-term. Eventually, the recycling project was chosen. As part of the discussion related to this project, the young people inventoried items that could be recycled around the school, and also proposed to use the recycling project to create a structure to provide shade for students who were waiting for transportation after school under the midday sun.
As part of researching for this project, I came across the ecobricks concept. Originating from the Philippines, what has since developed into the Global Ecobrick Alliance (n.d.) is dedicated to address the environmental challenge associated with plastic consumption through the reflective practice of making ecobricks. In essence, ecobrick is “the manual securing of used plastic in a PET bottle (also known as plastic sequestration) to make a reusable building block” (Global Ecobrick Alliance, n.d.). Given the minimal cost associated with this activity, alongside the abundance of single-use plastic waste in the school as identified by the young people, I suggested this concept to them. Subsequently, they conducted Internet search about single-use plastic and plastic pollution in Malaysia. Following this, the young people collected single-use plastic waste (mainly food wrappings) and disposable plastic drinking bottles around the school compound, and began the process of making ecobricks. Figure 1 shows ecobricks in various stages of completion. These ecobricks were then combined to create a stool that they would bring to the competition. In addition to the ecobricks, with the guidance of one of their STEM teachers, the young people also created technical drawings of their proposed structure that could serve as shelter for students.
To accompany their proposal, the young people built a small prototype design of the shelter using recycled materials such as cardboard packaging and juice cartons (see Figure 2), prepared an abstract for their project and also a poster detailing the project. These activities took place during free periods in the school day, after school, as well as on weekends leading up to the competition. Throughout the project, I alongside a few other teachers provided guidance, suggestions and support, as this was the first time the young people had participated in an activity of this nature. They had the opportunity to rehearse their presentation in front of their peers as well as a group of teachers in preparation for the competition. In this way, the young people in this project experienced the process of articulating their aspirations and devising a solution to a local problem.
Eventually, on 6 February 2020, we travelled to the local university in the state capital to participate in the STEM innovation competition. It was an eye opening experience for the young people to see their work representing Sekolah Luar Bandar, and standing alongside those of peers from other schools in the state. Throughout the day they had the chance to present their project to judges and visitors, learn about other projects and attend career exposure events organized by the university. Figure 3 shows the young people presenting their project to the judges. By the end of the day, it was a wonderful and surprising moment when Sekolah Luar Bandar was announced as one of the schools that received the gold medal in the competition. This was a remarkable feat for a first time entrant. Such a jubilant outcome thus sets the scene for reflecting on how this project serves as an educative experience. It provides the opportunity for young people to develop their capacity to aspire, in relation to questions of development intimately tied to their surroundings.

**Engaging in the Structure of Rasa**

Based on the participation of the young people in the informal STEM education project described above, I analyze semi-structured interviews conducted with the young people reflecting on these experiences, coupled with my own extensive fieldnotes in order to address the research question: “How might rural young people enact their capacity to aspire in relation to STEM education and their embeddedness in a rural place?” This data was subjected to reflexive thematic analysis (Braun & Clarke, 2021) in order to construct themes guided by Sellar & Gale’s (2011) new structure of feeling that includes dimensions of mobility, aspiration and voice described before. Grounded in the empirical data, I rework this structure of feeling through a dialogue with the Malay concept of rasa. Yaapar (2005) observes how the Malay poet and intellectual Muhammad Haji Salleh conceptualizes rasa as a form of consciousness:
In his critical writings, the term Muhammad uses for consciousness is rasa. However, his description of the term suggests that it is richer than consciousness itself. It includes feeling, intuition, conscience, taste, and sensitivity. According to Muhammad (1977b), “these faculties are put to use along with that of the mind at one moment of thought” (p. 295)

Based on young people’s own use of rasa in reflecting about their participation in this informal STEM education project, I take on this term as the overarching concept that reflects the tentative, emerging nature of young people’s aspirations forged through this experience. In the original conceptualization of structure of feeling, Williams (1977) highlights how this concept is characterized as “a set, with specific internal relations, at once interlocking and in tension. Yet we are also defining a social experience which is still in process, often indeed not yet recognized as social but taken to be private, idiosyncratic, and even isolating.” (p. 132). Through engaging with instances of rasa as evident through young people’s reflections in this project, I rework Sellar & Gale’s (2011) version of the new structure of feeling involving mobility, aspiration and voice to carve out the elements that form a structure of rasa for rural young people. This structure of rasa, I argue, facilitates young people to enact their capacity to aspire through engagement in informal STEM education that attends to challenges specific to their rural environment. Below, I present elements that constitute this proposed structure of rasa.

**Voicing concerns here (and out there)**

Through their participation in this informal STEM education project, young people were provided the opportunity to discuss the challenges related to development, which they have observed in their school and surrounding community. The brainstorming activity resulted in various suggestions that demonstrate the young people’s sensitivity to matters deemed important in their lives which—given the permission and opportunity—they could contribute in addressing through the application of STEM education. This possibility is aligned with the principles of YPAR, YPS as well as place-based science education. I recorded the following ideas young people described during the brainstorm activity in my fieldnotes on 14 January 2020:

- Do something about the gate to curb student truancy
- Recycling bin in the school
- Insufficient chairs in the canteen during recess
- Herbal garden
- Curb students smoking in the toilet
- More interesting clubs, or even an afterschool club.space
- Bell/system for movement between classes
- Biomass project with cow droppings around the village
- Do something with excess material/packaging from co-op
- Do something with broken chairs—turn into brooms?
- Rearing chickens for the vocational class
- Broken locks in the toilet
- Outdoor learning space

These ideas were eventually aggregated as potential projects and voted on by the young people, as highlighted in the previous section. Upon reflection of their participation in the competition, they were also able to articulate the significance of this project beyond the specificity of the problem they were addressing (abundance of single use plastic waste in their school). Gesturing towards broader concerns about the environment, one of the young people, Petir, highlights how he,
rasa the importance of this project...firstly it reduces environmental pollution. Secondly, it also enables us to create amenities using waste that could contribute to pollution. When we use this waste to make the amenities, the waste in our country will be reduced.

Additionally, beyond the national scale, another young person, Ceney, connects this experience further outwards, using India as an example:

We get to take care of the environment from pollution resulting from plastic burning. Disposal of plastic waste too, because now overseas, in New Delhi, we can see they have a garbage mountain.

Together, these reflections suggest how participation in this informal STEM education project served as a platform for the young people to voice their concerns. These concerns were not limited to their locality, but also tied to broader questions of development out there. In this way, exercising their voice hints at their aspirations for development, articulated through a specific issue that concerns them in their immediate environment. The issue of plastic pollution, in this instance, points to one of the modern challenges encroaching rural communities in Malaysia. When young people voice out their concerns at the intersection of this challenge and STEM education, their situated, experiential knowledge about development ought to be taken seriously in line with the tenet of YPAR.

**Exposure to novel, embodied encounters**

Young people in this study also developed experiential knowledge through the exposure to novel, embodied encounters gained in this project. Most of the young people in this study reported that this was the first time they were involved in a project of this nature. During the preparation stage, I recall a moment when one of the students, Ana, was hesitant to participate:

Cikgu H stops by the room that we use to prepare for the competition and we chatted about travel arrangements. She told me that earlier, Ana spoke to her during physical education class [about her hesitation]. Cikgu H thinks Ana is nervous about the competition. We discuss the importance of giving the young people opportunity and exposure through activities such as this. (Fieldnotes, 3 February 2020).

This feeling of trepidation is not unique to Ana, as other young people also reflected on feeling nervous prior to the competition. Here, although young people are keen to use their voice to articulate aspirations for development, their voice is in tension with the affect of nervousness and doubt. After the competition, H4lfiey reflected how he “rasa nervous too, because we are competing with schools that are smart.” Still, the opportunity to develop confidence is opened up in the process of participating in such a novel experience.

Even for Petir, who appeared confident and had experience representing the school in public-facing competitions before, there was novelty in this specific experience:

In my experience joining...I rasa it is a new experience...and we can say we got to compete, we got to know the scene there, to get used to it, and I rasa it's a new [experience] for me.
Here, Petir is referring to the embodied experience of traveling to the university in the state capital from Sekolah Luar Bandar to participate in the competition among students from other schools. During the competition, the young people were able to “demonstrate making ecobricks for people that came to visit their booth…[Ceney] said he got some challenging questions from visitors.” (Fieldnotes, 6 February 2020). This is also evidence of an embodied experience—young people “in action” in front of the audience of the public and competition judges.

Later, when reflecting on his participation, Ceney remarked that he “got to see what microplastic is…to visit UMT (the state university), see how they learn. That was my experience.” In addition to participating in the competition, the young people in this study also had the opportunity to visit exhibitions by various research groups at the university, such as the one on microplastics mentioned by Ceney. They were thus able to link their project on ecobricks with this research project conducted at the university level, thus discovering another relevant connection beyond their immediate locality.

Conclusion: Enacting the capacity to aspire

...the capacity to aspire, like any complex cultural capacity, thrives and survives on practice, repetition, exploration, conjecture, and refutation. Where the opportunities for such conjecture and refutation in regard to the future are limited... it follows that the capacity itself remains relatively less developed. (Appadurai, 2004, p. 69)

Young people's participation in this informal STEM education project—that attends to the challenges they have voiced themselves—point to an occasion for enacting the capacity to aspire. If the capacity to aspire, as argued by Appadurai (2004) above requires moments of friction, of practice, of investigation, then this project provides space for such moments. The structure of rasa that I have proposed, with the interlinking elements of voicing concerns and exposure to novel encounters, provides the emerging frame through which young people's capacity to aspire—in relation to questions of development—may possibly be strengthened. This structure of rasa is not merely upheld by positive moments, such as young people vocalizing their own perspectives, establishing connection between issues and building confidence, but also by affects of doubt and fear. The interplay between such poles sustains the possibility of young people enacting their capacity to aspire in the manner described by Appadurai (2004). This possibility is reflected by one of the young people's reflections below:

I gained a new experience...I was hesitant to join before, but starting from [this competition] I rasa want to join again. (Wan)

It is not clear if Wan will, in fact participate in future projects and competitions in the similar vein as discussed in this paper. Nevertheless, the possibility remains open. The structure of rasa may be enriched by other educative moments where young people are able to voice their concerns and partake in encounters that are novel and embodied. To provide a breadth of education opportunities in this spirit for young people enables them to be, in the words of Amartya Sen (1999), “actively involved—given the opportunity—in shaping their own destiny” (p. 53), thus enacting their aspirations for development.
The 1st International Yidan Prize Doctoral Conference posed two questions as themes, which I reiterate here:
1) How will education be delivered in the future? 2) What are the skills young people need [in order] to pursue challenges they have? Through the informal STEM education project presented in this paper, I argue that the future of education must still attend to the particularities of place, the development challenges immediately “felt” by young people in such places, and the active role that they can play to address such challenges. The young people in this study chose to work on a project addressing plastic pollution that is encroaching their rural community. Looking beyond this locality, challenges of development in contemporary times are as wide-ranging as climate change, forced migration, broadening inequality and the like. The building bricks of this kind of education call for opportunities for young people to exercise their capacity to aspire, focusing on cultivating problem solving, imaginative, and collaborative skills through a participatory spirit. The capacity to aspire must also pay attention to lived experiences in a particular place, coupled with novel encounters that enable young people to exercise this capacity frequently and purposefully.

In this paper, I proposed the structure of rasa as a way of framing the enactment of this capacity to aspire. I end with an anecdote that signifies the potency of the structure of rasa for rural young people grappling with questions of development:

On 11 January 2021, I received a WhatsApp message from Petir, one of the young people in this study. He excitedly shared with me a video he had just watched that showcased building blocks made using plastic waste (ByBlock). It reminded us both of the project we worked on almost a year prior, which had clearly left an impression on him. I would like to think of this as an example of the potency of the structure of rasa that facilitated the enactment of his capacity to aspire through informal STEM education...

Acknowledgement
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References


The digitalized economy and skills shift – are sub-Saharan African firms ready?

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Abstract
Due to recent technological advancements and increased connectedness, the world is challenged to develop resilient, sustainable and scalable solutions to creating decent jobs. This challenge is much more felt in Sub-Saharan Africa whose preparedness to adapt and cope with the global changing needs is still questionable. This study analyses Sub-Saharan African firms and evaluates their preparedness to adapting to the needs of the digitalized economy and the skills shifts. A sample of over 5,000 firms from eight Sub-Saharan Africa countries from the World Bank Enterprise Survey is used. Probit regression model is run to analyze the influence of firms and employees’ characteristics on digital technology and innovation adoption. The results show that firm characteristics and employees’ features have an important influence (and hence, a determining power) in the adoption of digital technology and innovation. Firm’s location; its legal status; presence of foreign ownership; its size and age; the industrial classification; gender of owner and; competition have a significant influence on the tendency of firms to adopt digital technology and innovate. As for employment features, training of workers; the levels of skill and years of education of workers are significant. Interestingly, both the firm characteristics and employees’ features that are observed to be good predictors of digital technology and innovation adoption are represented in very smaller proportions by the firms existing in Sub-Saharan African countries. This paper helps in understanding the existing gap. However, knowing what it takes to get there is one step but moving from where it is to where it ought to be is another step which requires a more collaborative action from other actors (government, learning institutions and private sectors).

Keywords
Sub-Saharan Africa, Digital technology adoption, ICT, jobs, firms, employees, innovation.
Introduction

Over the last two decades the world has witnessed a global transition to the knowledge-based economy as characterized by technological advancements, globalization, competition and increased connectedness (Hadad, 2017; Chen & Dahlman, 2015; Khalifa, 2016). These technologies have brought great innovations across sectors and as a result, completely shifted the nature and the way of work and hence causing more concerns about the future of jobs and employment (Anthes, 2017; Brynjolfsson & Mitchell, 2017; Smith & Anderson, 2014). While there has been new skills and jobs being created - especially those requiring digital skills (Mexi, 2020), creativity and big data science - a lot of jobs (routine, seasonal, low skills jobs) are being replaced by machine learning (Brynjolfsson & Mitchell, 2017) with a significant share of occupations being predicted to be automated and hence affect over 1.2 billion employees (Manyika, 2017). According to Mckinsey & Company, 60 percent of all occupations globally have the likelihood of having 30 percent of its activities completely automated in few years to come making digital adoption inevitable by the workforce (Manyika, 2017). The working conditions as of recent, have been ever-changing, allowing for new employee behaviors, contracts, work designs and virtual organizations (Sparrow, 2000; Smith & Anderson, 2014; Trembley, 2003).

However, as evidently from the literature, all these happenings concerning digital technology advancements and accompanying innovation seemed like quite a distant, future problem for Sub-Saharan Africa (SSA) to worry about as compared to developed economies (Cathles, Nayyar, & Rücker, 2020; Comin & Hobijn, 2003; Tanburn & Singh, 2001; Bach, Zoroja, & Vukšić, 2013). When it comes to developing countries, the technological advancements; their translations and adoption by firms have been happening quite differently and much slower (Tanburn & Singh, 2001; Khalifa, 2016; Karakara & Osabuohien, 2020). Using limited data as well as the limited research done on the topic, findings show that there is still a very small representation of SSA firms advancing in technology usage, hence making the comparison with developed economies almost difficult (Parente, 1995; Comin & Hobijn, 2003; Mel, McKenzie, & Christopher, 2009). In other words, while the world is advancing towards technologies that accommodate artificial intelligence and robotics in transforming agriculture, transportation, green economies or education, Sub-Saharan Africa is yet to develop the very basic digital technology infrastructures as well as the skills needed that will facilitate the adoption.

For a start, Sub-Saharan Africa is characterized by low levels of internet connectedness with only 3 out of 10 people using the internet in Africa compared to 8 out of 10 people in Europe (ITU, 2020); low application of technology intensive inputs in manufacturing its products as it exports more of raw materials and resource-based products than medium and high-tech manufactured products (URT, 2012); its nature as importers and end-users of high-tech goods rather than manufacturers (Takahiro, 2004); weak and vulnerable employment structures characterized by low levels of skills and education for the significant share of the workforce (Fox et al., 2013; World Bank, 2021) hence limiting innovation and adoption of technologies (Chen & Dahlman, 2005; Nelson & Phelps, 1966).

The outbreak of Covid-19 pandemic in late 2019 completely disrupted the status quo whereas internet connectedness and technology friendliness became necessary and the new normal for most economies (Mexi, 2020; MacLeavy, 2021; ILO, 2020). This amplified the challenges on jobs and employment even more. Working conditions changed with hours of work significantly reduced hence disrupting over 400 million enterprise employers and own-account workers which in-turn affected employment globally, calling for a more serious response (ILO, 2020). Therefore, the challenge right now is on how countries can build resilient economies that can stand global transformations and crises through developing an adaptive, innovative and multi skilled workforce (ILO, 2019; ILO 2020). Navigating through this challenge looks even more complex when it comes to Sub-Saharan African firms which are sources of jobs and drivers of innovation, the very reason that stirred up the motivation for conducting this study in the first place. This paper seeks to study the Sub-Saharan African firms by analyzing their characteristics and those of its employed workforce; and assess the extent that they are adopting and hence adapting, to the digital technological advancements.
Using the World Bank enterprise survey for 2013 and 2014 for over 5,000 firms across 9 countries, the study first helps in understanding the status quo of Sub-Saharan African firms; the employees characteristics; and the extent of digital technology and innovation adoption. Secondly, using the Probit regression analysis, the paper examines if these characteristics may have influence on the decision to adopt digital technology as well as to innovate. Finally, the findings and discussions do conclude that the Sub-Saharan African firms' positioning is not yet ready to meet the needs of digitalization and innovation adequately. Policy prescriptions, study limitations and areas for further research are presented at the end of the paper.

The subsequent sections look at the evidence of the influence of firms and employees' characteristics on the digital technology and innovation adoption, presents the analytical framework and discusses the data and regression used and finally presents the findings and conclusions.

Firm Characteristics, employees' characteristics on technology adoption and innovation

Technology advancements as a terminology, its implication and application may be used differently across literature depending on the type of economy, specific firms' characteristics and the available data and therefore provide unique outcomes for each study. For instance a number of studies looked at the influence of certain firm characteristics (such as size, age, growth, foreign ownership) on the adoption and intensity of technology using outcome variables grouped into categories of advanced manufacturing technologies (AMT) which comprise of technologies such as computer-aided design and engineering, robots, computer integrated manufacturing and artificial intelligence systems (Baldwin & Diverty, 1995; Dunne, 1991; Bartelsman, Leeuwen, & Nieuwenhuijzen, 1998). Using the same approach, with similar metrics to test for comparable results might not be applicable for manufacturing firms in Sub-Saharan Africa since firm characteristics and structures are quite different as far as their use of such technology is concerned.

A lot more studies have explored and discussed technology advancement application by firms and households while focusing on the utilization of information and communication technology (ICT) which includes the use of digital or online tools, systems, software and infrastructures such as computers, internet, website, e-commerce, payment systems and so forth (Bach, Zoroja, & Vukšić, 2013). Similarly, this paper's empirical analysis also discusses technology advancements while mostly referring to digital technologies or Information and Communication Technology (ICT) and uses them interchangeably at some points in the study. Digital technology is appreciated and widely embraced due to its capacity to simply tasks, improve processes and minimize costs of operation, management and communication hence resulting in increased efficiency, productivity and overall performance of firms and economies at large (Cathles, Nayyar, & Rückert, 2020; Brynjolfsson & Hitt, 2000; Tanburn & Singh, 2001).

However, the adoption of technology is not a stand-alone concept and neither does it happen instantly (Baldwin & Diverty, 1995). Innovation and firm's organizational structure are among many complimenting factors that have been widely studied in relation to firm's decision and activities to adopt and/or intensify technology advancements (Brynjolfsson & Hitt, 2000; Astuti, Sanawiri, & Iqbal, 2020; Kraft, 1989; Baldwin & Diverty, 1995). Haller & Siedschlag (2007) show that firms that excel at using technology are likely to use it in transforming their organizational structure and strength and improve performance significantly. Other studies observe that firms with strong and good organizational structure are associated with the feature of being the good drivers and leaders of innovation and smooth technology adoption (Astuti, Sanawiri, & Iqbal, 2020; Dholakia & Kshetri, 2004; Brynjolfsson & Hitt, 2000; Khalifa, 2016). Other literature with most information capturing innovation activities (product, processes, marketing, research and development) in firms do incorporate the information on the use of technology and on the strength of organizational structure directly or indirectly as part and parcel of innovation (Johansson & Lööf, 2006; Brynjolfsson & Hitt, 2000; Kraft, 1989). Variety of studies have also described the uses of technology to be associated with innovation where ICT has been referred to as a channel, offering the platform for firms to innovate (Karakara & Osabuohien, 2020; Mel, McKenzie, & Christopher, 2009).
It is with the same exposure to these inter-links that this study aims to look at the Sub-Saharan African firms’ characteristics and employee’s characteristics as determinants of firm’s decision to adopt to digital technology; not a stand-alone outcome, but alongside other outcomes which are innovation and organizational strength. The main purpose is to observe the influence of these firm characteristics on the three outcome variables and study the direction, whether it is consistent across them in the same way they complement each other or otherwise. Most studies on this area have only worked to analyze firm characteristics on one of the outcome variables only (either technology adoption or innovation or organization strength/readiness) when it comes to the Sub-Saharan African firms (Karakara & Osabuohien, 2020).

A variety of firms’ characteristics and human capital features have been observed to have some influence on firms’ decisions to adopt to digital technology or innovation across literature (Haller & Siedschlag, 2007; Astuti, Sanawiri, & Iqbal, 2020; Dholakia & Kshetri, 2004; Johansson & Lööf, 2006; Khalifa, 2016; Kraft, 1989). Firm size seems to be the most dominant researched feature of all, where for most studies large (or medium) sized firms tend to almost always have a positive influence to adopt technology or innovate compared to smaller or micro firms which are described to have limited resources and less able to manage costs resulting from technology use (Dholakia & Kshetri, 2004; Johansson & Lööf, 2006; Mel, McKenzie, & Christopher, 2009; Khalifa, 2016).

Location of firm is important in explaining innovation adoption where firms that are in high-bandwidth telecommunication regions, centrally located or in urban regions are more in favor of adoption due to proximity externalities (markets, universities, suppliers, customers) compared to rural or country areas (Dholakia & Kshetri, 2004; Johansson & Lööf, 2006; Haller & Siedschlag, 2007). Presence of heavy competition is negatively associated with innovation (Mel, McKenzie, & Christopher, 2009; Kraft, 1989) but when it comes to digital technology adoption, the influence is significant and positive with competition (Dholakia & Kshetri, 2004; Khalifa, 2016). Foreign ownership affects technology adoption positively (Haller & Siedschlag, 2007). According to age, the technology adoption depends on other cross factors such as the type of technology being used such as computer use, internet use website or specific advanced manufacturing technology as well as the type of sector the firm belongs to such as manufacturing or retail or service and finally the base year anchored to determine how young or old is the firm. As a result, there are situations where younger firms have advantages (e.g., internet access and social media) and where older firms have advantages (e.g., Advanced Manufacturing technologies) (Gretton, Gali, & Parham, 2002; Baldwin & Diverty, 1995; Dunne, 1991). As for Australian firms, the service sector dominates the use of information technology (IT) compared to other sectors given its largest market share at 65 percent with Finance and Insurance sectors leading; manufacturing comes next in terms of adoption and lastly are the wholesale and retail trade sectors (Gretton, Gali, & Parham, 2002).

Firm owner or top manager characteristics such as gender, social economic background, levels of education, skills or exposure to ICT investment potential tend to have influence on technology adoption and innovation (Harindranath, Dyerson, & Barnes, 2008; Migiro & Ocholla, 2005). Mel et al. (2009) find that owner’s age is negatively correlated with innovation but the effect is insignificant and gender and marital status do not have significance on innovation. Human capital has a positive and significant effect on technology adoption and innovation (Mel, McKenzie, & Christopher, 2009; Khalifa, 2016; Haller & Siedschlag, 2007). Workforce qualities matter for firms’ adoption to technology and innovation (Brynjolfsson & Hitt, 2000). Education attainment has been used to explain the adaptation to technological developments through innovation since education helps in quickening the diffusion and technology in a firm (Nelson & Phelps, 1966; Smith & Anderson, 2014; Comin & Hobijn, 2003). Firms with employees that have attained more years of education or skills tend to also have higher adoption of ICT (Gretton, Gali, & Parham, 2002). Caselli & Coleman, (2001) findings show that a percentage increase of workers who have education higher than primary results in 1 percent increase in ICT investment per worker with more than 5 percent increase for non-exporting firms.
Analytical Framework

The focus of this study is represented in the analytical framework in Figure 1. The main hypothesis is that certain firms’ characteristics and employees’ (or workforce) characteristics have a determining power on decisions to using technology. However, although the firms’ decision to adopt to digital technology is not necessarily correlated nor dependent upon innovation activities and organizational strength of firm, this study seeks to see the interactions of firm’s characteristics with all the three outcome variables (together but separately) for more insights. The expected consistency is hypothesized that all firm’s characteristics and employee’s features with significant and positive influence on digital technology adoption will also have similar influence on innovation and organizational strength. Hypothesis example would be that, according to firm size; if compared to small firm, a large firm, due to its resource and capacity advantages is characterized by digitalization, then it will also likely to be innovating and also achieving organizational strengthening.

Figure 1: Analytical framework

Source: Author’s

Data and Methodology

Data

Study uses World Bank Enterprise Survey data which is the world’s most comprehensive firm-level dataset covering about 148 countries, capturing information on business environment topics such as access to finance, gender, corruption, infrastructure, innovation, competition, informality, and performance measures (World Bank, 2021). The dataset contains information from 2005/6 to date, however, the survey is conducted at different, inconsistent periodic years within and across countries which may sometime limit a comprehensive comparison analysis across multiple countries or regions over years, even with standardized indicators.

This is the same reason why this study included 7,087 formally registered firms from only nine Sub-Saharan African (SSA) countries namely DR Congo, Ghana, Kenya, Malawi, Namibia, Senegal, Tanzania, Uganda, and Zambia which were surveyed in 2013 and in 2014 for some. There was great inconsistency of years which limited the consideration to including many SSA countries as well as inconsistency of variables when considered including a selected number of countries over periods of time to observe trends. For instance, surveys before 2013 (those in 2006-2009) did not capture variables that represent technology adoption and innovation as well as in 2013. When it comes to more recent years (2017 and above), a lot of countries in the sample are not represented as no surveys were done, and as for those represented, the innovation and ICT variables are captured in a very different way. The data was filtered to only consist of the the firm characteristics, workforce characteristics, technology or ICT variables and innovation variables for all firms represented. The outcome variable for organizational strengthening of firms is part of innovation data that captures organizational structure and employees’ innovation.
Empirical Model

Binary choice model is the empirical model used for digital technology and innovation adoption (Bach, Zoroja, & Vukšić, 2013; Dunne, 1991). The main objective is to describe how firms’ adoption to digital technology and innovation varies with firm characteristics and employees features. The outcome variable \( Y_i \) is dichotomous whereas it equals 1 when a firm uses and hence adopts the given digital technology or innovates or improve organizational strength and is zero if otherwise (not). The dependent variable \( Y_i \) is then regressed on a set of firms’ characteristics and employees’ characteristics which are the explanatory variables \( X \) and will be explained in detail in the next section and on Table 1.

To estimate this model, the assumption that error term of the regression has mean \( \mu \) zero and variance \( \sigma^2 \) is taken into account (Cameron & Trivedi, 2009). Let \( P_i \) represent the probability of a firm adopting digital technology, that is using ICT (e.g., using email to communicate with customers and suppliers). As opposed to it is the probability of not adopting digital technology, which is given by \( 1 - P_i \). However, \( P_i \) is unobservable since \( Y_i \) is a latent variable and therefore \( Y_i = 1 \) is observed instead if the firm adopts and \( Y_i = 0 \) if it does not, hence the following Probit model specification (Cameron & Trivedi, 2009)

\[
\text{Prob} (Y_i = 1) = P_i = \text{Prob} (\mu_i - \beta) = 1 - (\Phi)
\]

\[
\text{Prob} (Y_i = 0) = 1 - P_i = \text{Prob} (\mu_i - \beta) = (\Phi)
\]

\( \Phi \) is the c.d.f. of the standard normal, \( \beta \) is a vector of coefficients to be estimated, and \( X \) is a matrix of independent variables (Cameron & Trivedi, 2009). The equations are:

Digital technology (ICT) = \( f \) (firm characteristics + employees characteristics)

Innovation (product, processes, marketing, R&D) = \( f \) (firm characteristics + employees characteristics)

Organizational Strength (organization structure and employees’ innovation) = \( f \) (firm characteristics + employees characteristics)

Since the data used to explain technology adoption (usage) and innovation in this study is captured only at a point in time, that is either in 2013 or 2014 and not periodically, this approach therefore does not employ the proportional hazard techniques but uses the standard modeling of technological adoption (Dunne, 1991). The data do not tell when the technology was initially adopted or when the firm started innovating neither the duration and extent of intensity that the firm has been using the technology. This puts a limitation to only observe a point of adoption on diffusion path without observing or estimate the whole diffusion curve. This study therefore only captures the adoption or the decision to use ICT and innovate but not the diffusion patterns.

Descriptive Statistics

Table 1 provides a descriptive summary of the variables used in the analysis. Starting with firm characteristics as part of explanatory variables, 50 percent of firms are located in the main business city and more than 50 percent of firms are owned by individuals under sole proprietorship legal status which says a lot about vulnerable employment of Sub-Saharan Africa. 78 percent are fully domestically owned firms; foreign presence is at 15 percent; state ownership presence is at 1 percent. Female owned firms are close to 30 percent. Only 16 percent of firms have quality certificates recognized internationally. 71 percent of firms are competing with informal, unregistered firms as opposed to other formalized local and international firms. There are more firms in manufacturing followed by services and lastly retail (see in appendix). 62 percent of firms are small and micro, employing less than 20 people (appendix).

Next is employees’ characteristics as another set of explanatory variables which consist of permanent, full-time employees in different categories; production workers versus non-production workers; skilled production workers versus non-skilled production workers; years of education of production workers; percentage of workers who have completed high school; and lastly proportion of firms that had training programs for its employees which is 28 percent. The rest are continuous variables as seen on the table.
Lastly are the three outcome variables where by digital technology (ICT adoption), 68 percent of firms are either using internet; computer; website; email or licensed technology from foreign company; on innovation, 65 percent of firms are either innovating products, processes or spending on R&D; and on organizational strength, 55 percent of firms are improving organizational structure or encouraging employees to innovate. Table A1 in the appendix show disparities across countries where DR Congo has the highest number of firms but is lowest in adoption, innovation and organizational strength. Kenya, Namibia and Malawi have the highest rates of ICT adoption, with Tanzania being the lowest. Namibia, Uganda and Malawi record the highest percentages of innovation.

Table 1: Descriptive Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 if Establishment is located in the main business city</td>
<td>7,087</td>
<td>0.500</td>
<td>0.500</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 if Establishment is part of the large firm</td>
<td>7,087</td>
<td>0.157</td>
<td>0.363</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 if legal status is Sole Proprietorship</td>
<td>7,039</td>
<td>0.561</td>
<td>0.496</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 if 100 percent domestic ownership</td>
<td>6,909</td>
<td>0.786</td>
<td>0.410</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 if foreign ownership is present (in %)</td>
<td>6,835</td>
<td>0.151</td>
<td>0.358</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 if state ownership is present (in %)</td>
<td>6,912</td>
<td>0.012</td>
<td>0.111</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Age of Establishment</strong></td>
<td>6,835</td>
<td>15.245</td>
<td>13.100</td>
<td>0</td>
<td>166</td>
</tr>
<tr>
<td><strong>Establishment Size (small; medium and large)</strong></td>
<td>7,087</td>
<td>0.492</td>
<td>0.687</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Industry (manufacturing; retail; service)</strong></td>
<td>7,086</td>
<td>0.841</td>
<td>0.872</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1 if there is female owner(s)</td>
<td>6,998</td>
<td>0.294</td>
<td>0.456</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Top Manager’s Years of Experience</strong></td>
<td>6,841</td>
<td>15.146</td>
<td>9.926</td>
<td>1</td>
<td>66</td>
</tr>
<tr>
<td>1 if establishment has an internationally recognized quality certification</td>
<td>6,865</td>
<td>0.160</td>
<td>0.367</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 if competes against unregistered or informal firms</td>
<td>6,695</td>
<td>0.713</td>
<td>0.453</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Employment Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of full-time production workers</td>
<td>3,164</td>
<td>45.326</td>
<td>198.785</td>
<td>1</td>
<td>7000</td>
</tr>
<tr>
<td>Number of full-time skilled production workers</td>
<td>3,192</td>
<td>27.707</td>
<td>103.363</td>
<td>0</td>
<td>3000</td>
</tr>
<tr>
<td>Average years of education for typical production worker</td>
<td>2,762</td>
<td>11.477</td>
<td>37.849</td>
<td>0</td>
<td>1984</td>
</tr>
<tr>
<td>Percentage of full-time workers who have completed high school</td>
<td>6,396</td>
<td>61.597</td>
<td>35.439</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>1 if had formal training programs for permanent, full-time employees</td>
<td>7,005</td>
<td>0.285</td>
<td>0.452</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
### Outcome Variables

| Description                                                                 | N   | B     | S.E    | P (>|0|) | P (|=|0|) |
|----------------------------------------------------------------------------|-----|-------|--------|---------|---------|
| 1 if Establishment is using internet, computer, e-mail, website or technology licensed from a foreign owned company. | 7,087 | 0.684 | 0.464  | 0       | 1       |
| 1 if Establishment introduced new or significantly improved product or service, method of manufacturing or offering services or spent on formal R&D activities in last 3 years. | 6,957 | 0.652 | 0.476  | 0       | 1       |
| 1 if Establishment introduced new or significantly improved organizational structures or management practices or; gave employees time to develop new idea in last 3 years. | 6,365 | 0.552 | 0.497  | 0       | 1       |

*Source: Author’s calculations*

### Results and Discussion

Presented in Table 2 and Table 3 are the findings consisting of marginal effects results which are run after Probit regression analysis to get probabilities. Due to high disparities in the numbers of observation between firm characteristics variables and those of employees’ characteristics, Probit model initially regresses each of the 3 outcome variables on firm characteristics only as presented in Table 2. Table 3 is the result of including the employees’ characteristics to the initial models for regression.

**Firm Characteristics on adoption of digital technology, innovation and organizational strength:**

This section discusses results of firm characteristics on digital technology (ICT), innovation and organizational strength outcome variables. Firms being located in the main business city increases its probability to adopt to digital technology: innovate and to strengthen its organization. Proximity to the business city which is likely to be the urban areas provides firms with great access to opportunities and infrastructure (including digital) compared to those located far off, within rural setting (which is 50 percent of firms). Sole Proprietorship has significant effect but is also negative throughout; that is, compared to other legal statuses, individual ownership reduces the probabilities to adoption to digital technology, to innovate and to strengthen organization. This is an interesting finding since about 56 percent of firms across different sectors and sizes are under sole proprietorship. The effect of foreign ownership is significant throughout with increased probability to ICT adoption but decreasing probabilities for both innovation and organizational strength. The influence of foreign ownership on innovation is in contrast to the findings in other studies and hence stirs curiosity to further investigate on the nature, types and levels of foreign presence in these firms. One possibility could be that foreign presence in Sub-Saharan African firms comprises of having local firms imitating most of what comes from the foreign or mother company as is, and hence leaving less room for innovation. State owned firms are not significant throughout however the negative probabilities on digital technology adoption and innovation are worth noting since the government is often times looked at as the enabler of conducive business environment for firms to thrive. Firm size matters even for Sub-Saharan African firms where medium and large size firms compared to small firms are significant and positive throughout the outcome variables. This is about 38 percent of all firms represented (large and medium combined), whereas the rest are small and micro firms.
Retail and services compared to manufacturing sector are both significant and positive for ICT adoption but negative for innovation (with only retail having significant effect), and the effect on organizational strength is not significant for both. This means innovation is more present in manufacturing compared to service and retail. Female ownership although present at 30 percent is positive and significant throughout all the outcome variables compared to male owned firms. Years of experience of the top manager is significant throughout however it is positive for ICT adoption but negative for innovation and organizational strength. This attracts further investigation since it is contrary to the findings by age of firm variable that is positive throughout.

As seen from the literature, years of experience alone might not be adequate to have influence after all and perhaps it matters to analyze other qualities of the top manager such as education, ICT exposure, social background, age etc. which were all limited in this survey. International quality certification has a significant influence on all outcome variables with positive probabilities. Unfortunately, it is a small proportion of firms that are certified. Competition from informal, unregistered firms has significant effect on ICT adoption and innovation but is negative and positive probabilities respectively. The findings seem to be contrary of wide literature that shows that competition decreases the likelihood to innovate. However, when competition comes from informal, unregistered firms as compared to other national and international formal firms, the probability to ICT adoption decreases.

Table 2: Regression of Marginal Effects: Firm characteristics on digital technology, innovation and organizational strength

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>ICT</th>
<th>Innovation</th>
<th>Organizational Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 if Establishment is located in the main business city</td>
<td>0.096*** (0.011)</td>
<td>0.059*** (0.012)</td>
<td>0.022* (0.013)</td>
</tr>
<tr>
<td>1 if Establishment is part of the large firm</td>
<td>0.087*** (0.018)</td>
<td>-0.004 (0.019)</td>
<td>-0.005 (0.020)</td>
</tr>
<tr>
<td>1 if legal status is Sole Proprietorship</td>
<td>-0.159*** (0.012)</td>
<td>-0.103*** (0.014)</td>
<td>-0.135*** (0.015)</td>
</tr>
<tr>
<td>1 if 100 percent domestic ownership</td>
<td>0.002 (0.023)</td>
<td>-0.009 (0.027)</td>
<td>-0.050* (0.029)</td>
</tr>
<tr>
<td>1 if foreign ownership is present (in %)</td>
<td>0.085*** (0.027)</td>
<td>-0.060* (0.032)</td>
<td>-0.125*** (0.032)</td>
</tr>
<tr>
<td>1 if state ownership is present (in %)</td>
<td>-0.012 (0.071)</td>
<td>0.056 (0.063)</td>
<td>0.103 (0.067)</td>
</tr>
<tr>
<td>Age of Establishment</td>
<td>0.000 (0.001)</td>
<td>0.001** (0.001)</td>
<td>0.003*** (0.001)</td>
</tr>
<tr>
<td>Size – Medium (20 -99 employees)</td>
<td>0.200*** (0.013)</td>
<td>0.068*** (0.015)</td>
<td>0.080*** (0.016)</td>
</tr>
<tr>
<td>Size – Large (100 and above employees)</td>
<td>0.304*** (0.017)</td>
<td>0.129*** (0.022)</td>
<td>0.172*** (0.024)</td>
</tr>
<tr>
<td>Sector - Retail</td>
<td>0.072*** (0.014)</td>
<td>-0.040** (0.016)</td>
<td>-0.002 (0.017)</td>
</tr>
<tr>
<td>Sector - Service</td>
<td>0.095*** (0.013)</td>
<td>-0.020 (0.014)</td>
<td>0.009 (0.015)</td>
</tr>
<tr>
<td>1 if there is female owner(s)</td>
<td>0.035*** (0.012)</td>
<td>0.038*** (0.014)</td>
<td>0.040*** (0.015)</td>
</tr>
<tr>
<td>Top Manager’s Years of Experience</td>
<td>0.002*** (0.001)</td>
<td>-0.002*** (0.001)</td>
<td>-0.001* (0.001)</td>
</tr>
</tbody>
</table>
Employees’ Characteristics on adoption of digital technology, innovation and organizational strength:

Table 3 presents results when employee’s characteristics are added to the firm characteristics and Probit regression is run. As noted, the numbers of observations change significantly to account for missing observations when employee characteristics are added to the model. However, except for changed coefficients and probabilities, there are no significant changes on the influence of firms’ characteristics on adoption of ICT, innovation and organizational strength in terms of significance and the direction (signs) meaning that the implication of initial results still holds even with decreased sample size. An increase of production workers relative to non-production workers reduced the probability to ICT adoption of the firm. Skilled production workers have a significant effect on ICT adoption where an increase in skilled production workers relative to unskilled production workers increases its probability to adopt. More years of education for production workers increases probabilities with significance for adoption in ICT and innovation; same for high school completion percentages in firms whereas when it is higher, the effect is positive and significant for both ICT adoption and organizational strengthening. Finally, is the effect of training programs which is positive and significant throughout all outcome variables with stronger probabilities at 21percent and 23 percent for innovation and organizational strength respectively. This is in line with the literature findings in other studies as presented earlier.

Notes: Robust Standard errors are presented in the parenthesis. ***; **; * represent levels of significance at 1 percent, 5 percent and 10 percent respectively.

Source: Author’s calculations

<table>
<thead>
<tr>
<th></th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 if establishment has an internationally recognized quality certification</td>
<td>0.143*** (0.017)</td>
<td>0.130*** (0.017)</td>
<td>0.155*** (0.019)</td>
</tr>
<tr>
<td>1 if competes against unregistered or informal firms</td>
<td>-0.080*** (0.012)</td>
<td>0.039*** (0.014)</td>
<td>0.009 (0.015)</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td>0.2090</td>
<td>0.0466</td>
<td>0.0629</td>
</tr>
<tr>
<td>Prob &gt; chi2</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Wald chi2(15)</td>
<td>1041.18</td>
<td>321.22</td>
<td>408.94</td>
</tr>
<tr>
<td>Observations</td>
<td>5944</td>
<td>5862</td>
<td>5353</td>
</tr>
</tbody>
</table>
Table 3: Regression of Marginal Effects: Firm characteristics and Employees’ characteristics on digital technology, innovation and organizational strength

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>ICT</th>
<th>Innovation</th>
<th>Organizational Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 if Establishment is located in the main business city</td>
<td>0.079**</td>
<td>0.047**</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.020)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>1 if Establishment is part of the large firm</td>
<td>0.122***</td>
<td>0.013</td>
<td>0.043</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.032)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>1 if legal status is Sole Proprietorship</td>
<td>-0.153***</td>
<td>-0.122***</td>
<td>-0.152***</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.023)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>1 if foreign ownership is present (in %)</td>
<td>0.109***</td>
<td>-0.004</td>
<td>-0.091*</td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td>(0.046)</td>
<td>(0.049)</td>
</tr>
<tr>
<td>1 if state ownership is present (in %)</td>
<td>-0.037</td>
<td>-0.011</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.086)</td>
<td>(0.087)</td>
<td>(0.094)</td>
</tr>
<tr>
<td>Age of Establishment</td>
<td>0.000</td>
<td>0.001*</td>
<td>0.002**</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Size – Medium (20 -99 employees)</td>
<td>0.158***</td>
<td>0.049**</td>
<td>0.073***</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>Size – Large (100 and above employees)</td>
<td>0.137**</td>
<td>0.087**</td>
<td>0.129***</td>
</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.040)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Industry - Service</td>
<td>0.257***</td>
<td>-0.068</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.112)</td>
<td>(0.107)</td>
</tr>
<tr>
<td>Top Manager’s Years of Experience</td>
<td>0.001</td>
<td>-0.002**</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>1 if establishment has an internationally recognized quality certification</td>
<td>0.121***</td>
<td>0.007</td>
<td>0.055*</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.030)</td>
<td>(0.031)</td>
</tr>
<tr>
<td>1 if competes against unregistered or informal firms</td>
<td>-0.060***</td>
<td>0.022</td>
<td>-0.035</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.022)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>Number of full-time production workers</td>
<td>-0.007**</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Number of full-time skilled production workers</td>
<td>0.002**</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Average years of education for typical production worker</td>
<td>0.008***</td>
<td>0.004*</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Percentage of full-time workers who have completed high school</td>
<td>0.000*</td>
<td>0.000</td>
<td>0.001***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>1 if had formal training programs for permanent, full-time employees</td>
<td>0.076***</td>
<td>0.218***</td>
<td>0.239***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td>0.3450</td>
<td>0.1029</td>
<td>0.1382</td>
</tr>
<tr>
<td>Prob &gt; chi2</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Wald chi2(15)</td>
<td>533.85</td>
<td>220.47</td>
<td>306.43</td>
</tr>
<tr>
<td>Observations</td>
<td>2167</td>
<td>2149</td>
<td>2053</td>
</tr>
</tbody>
</table>

Notes: Robust Standard errors are presented in the parenthesis. ***, **; * represent levels of significance at 1 percent, 5 percent and 10 percent respectively.

Source: Author’s calculations
Conclusion

This study helps in setting ground for understanding Sub-Saharan African formal firms in terms of their characteristics, their workforce characteristics and how they influence the digitalization process as well as innovation and organizational strengthening efforts of firms. The findings do indeed explain that technological advancements adoption, innovation and organizational strengthening decisions are influenced by certain firm characteristics and employee characteristics. A Sub-Saharan African firm located in the main business city; that is not a sole proprietorship but has foreign presence in ownership; that is medium or large in size (in terms of employees’ numbers); that is in retail or in service sector; with more female owners; has an internationally recognized quality certificate and competes with other formal national and international markets; has highly educated and skilled non-production and/or production workers; runs training programs for its workers - this, according to the findings, is the ideal firm with the likelihood to adopt to technological advancements; to innovate and to strengthen its organization.

Unfortunately, this is not a reality for many Sub-Saharan African (SSA) firms as it has been shown from the descriptive summary (Table 1). Comparing to the status quo, SSA firms are not ready to sufficiently adopt and adapt to the emerging digital technological changes happening from advanced economies, and now globally. However, if it is to start from where it is now, then further research will be required to understand the significant share of firm characteristics less adopting technology and why is it so. Education, skilling and training of employees is an important feature to strengthen on, for building a desired workforce. As for Sub-Saharan Africa, deepening investment in basic but relevant digital or ICT knowledge and skills would have a significant effect. Findings show that service and retail sectors are emerging fast and dominating market share but are less innovative. The same for domestically owned and foreign firms. Although most of these firms are small and micro, further research would be helpful in understanding the nature of products and services being traded, the methods of production, distribution and marketing as well as the nature of customers and suppliers and how that affects innovation efforts by these firms. Promoting and nurturing local innovation through education and other relevant local and international policies would also be helpful. Finally, is the lack of rich, up to date and coordinated data across considerable number of years for some variables of interest for the SSA countries used in this study which made it a challenge to get more recent observations. Further research using countries with updated, more recent data (with Covid-19 follow up) would be useful to study patterns of firm characteristics and adoption and whether the same features still hold.
Appendix

Table A1. Overview of firms across countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Firms</th>
<th>ICT use</th>
<th>Innovation</th>
<th>Organizational Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namibia</td>
<td>580</td>
<td>89%</td>
<td>81%</td>
<td>64%</td>
</tr>
<tr>
<td>Ghana</td>
<td>720</td>
<td>77%</td>
<td>65%</td>
<td>52%</td>
</tr>
<tr>
<td>DRC</td>
<td>1,587</td>
<td>53%</td>
<td>52%</td>
<td>41%</td>
</tr>
<tr>
<td>Malawi</td>
<td>523</td>
<td>88%</td>
<td>68%</td>
<td>59%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>813</td>
<td>51%</td>
<td>64%</td>
<td>57%</td>
</tr>
<tr>
<td>Uganda</td>
<td>762</td>
<td>60%</td>
<td>73%</td>
<td>62%</td>
</tr>
<tr>
<td>Zambia</td>
<td>720</td>
<td>74%</td>
<td>68%</td>
<td>57%</td>
</tr>
<tr>
<td>Senegal</td>
<td>601</td>
<td>58%</td>
<td>56%</td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>781</td>
<td>93%</td>
<td>78%</td>
<td>69%</td>
</tr>
<tr>
<td>Total</td>
<td>7,087</td>
<td>7,087</td>
<td>6,957</td>
<td>6,365</td>
</tr>
</tbody>
</table>

Table A2. Tabulated results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>4,383</td>
<td>61.85</td>
<td>61.85</td>
</tr>
<tr>
<td>Medium</td>
<td>1,919</td>
<td>27.08</td>
<td>88.92</td>
</tr>
<tr>
<td>Large</td>
<td>785</td>
<td>11.08</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>7,087</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sector Classification</th>
<th>Freq.</th>
<th>Percent</th>
<th>Cum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>3,347</td>
<td>47.23</td>
<td>47.23</td>
</tr>
<tr>
<td>Retail</td>
<td>1,518</td>
<td>21.42</td>
<td>68.66</td>
</tr>
<tr>
<td>Services</td>
<td>2,221</td>
<td>31.34</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>7,086</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
The transformation of learning spaces through the play: Not another brick in the wall but everybody is kung fu fighting...

Deniz Altindag, Çanakkale Onsekiz Mart University, Turkey

Abstract

With the beginning of the studies about learning process at the cognitive level and the change in our understanding of what learning is accompanied by progressive approaches, the question of what kind of changes the future of education will bring to learning spaces has become one of the current educational problems. One of the main questions of this research is this kind of question: How can we begin to design a space that will respond to the new performative approach of the transforming education style?

The first thing that will catch your attention when you search the literature on learning spaces is the relative scarcity of research on effective learning environments (Higgins et al., 2005). The researches about learning space done so far has mostly focused on the principles of minimum architectural comfort. But what will happen after the minimum comfort conditions are provided architecturally? The aim of this research is to draw attention to the design problems that we need to consider in order to develop alternative spatial solutions for the learning environments of the future, and to seek ways to solve these design problems through using the creative philosophy of the play. Considering the close relationship the game establishes with experience, it may make sense to imagine it in progressive education. At that point, rethinking the learning spaces through the philosophy of play can enable to imagine an experimental environment for learning.

Keywords

Learning spaces, play, playful utopias, progressive education
As an introduction

“Aion is a child playing checkers, the kingdom belongs to the child”.  
_Heraclitus, 52. Fragment_

Why don't children and people smile when they hear the word “school”, the way they do when they hear the word “playground”? Could this be a design problem?

With the beginning of the study of learning at the cognitive level and the change in our understanding of what learning is accompanied by progressive approaches, the question of what kind of changes progress in education will bring to learning spaces has become one of the current educational problems. One of the main questions of this research is this kind of question: Where can we begin to design a space that will respond to the new performative approach of the transforming education style?

The first thing that will catch your attention when you search the literature on learning spaces is the relative scarcity of research on effective learning environments (Higgins et al., 2005) When you scan the literature on school space designs, you will see that the researches done so far has mostly focused on the principles of minimum architectural comfort. But what will happen after the minimum comfort conditions are provided architecturally? Does the story end here? What's the subsequent step?

“No one knows how to prevent ‘learning-loss’ when you design a room “pedagogically”, whereas we know lots about designing for minimum heat loss”  
_Stephen Heppell._

1. The story begins when you go beyond the minimum comfort conditions...
2. Well, let’s begin with the research questions;
3. How the learning process works?
4. To what extent spatial factors affect learning and creativity?
5. What kind of spatial values do we need for effective learning?
6. To what extent are the game and learning process similar?
7. Can we use the fundamental features of a playground to enable deep concentration, creativity, experience and long term memory while designing learning spaces?

The aim of this research is to draw attention to the design problems that we need to consider in order to support effective learning spatially after providing the minimum comfort conditions, and to seek ways to solve these design problems through using the effective philosophy of the play. The experimental laboratory of this research is to be able to develop alternative spatial solutions for the learning spaces of the future based on the similarity between game philosophy and the learning realization mechanism.

Trying to expand the understanding of play

I would like to draw attention to the deep relationship between learning and play with the following question of James Gee, one of the pioneers in this field:

“How do good game designers manage to get new players to learn long, complex, and difficult games?

The short answer is that designers of good games have hit on excellent methods for getting people to learn and to enjoy learning. The longer answer is more complex”  
_(James Gee, 2005)_
At this point, to consider the relationship between play and learning, it might be a good start to remember the *Utopia* that Bernard Suits mentions in his book *Grasshopper: Game, life and utopia*. In the dream of *Utopia* where “all utilitarian activities are eliminated,” Suits questions what it means to play games. In this utopian world where all the minimum comfort conditions are provided by automatic machines for people’s lives, people have nothing left to do start playing. According to Suits, the game perfectly meets the need to do something (Suits, 2005).

In psychology and physiology, play is described in various ways. One of the two basic theories about the game that has developed since the 20th century is the surplus theory. Accordingly, games are actions taken to get rid of excess life energy. The playground creates a safe place to release this excess life energy (Norman, 2014). According to the functionalist theory, play is the way to prepare for future activities. Gross, one of the functionalist theorists, tells that in the game, people and animals are prepared for the serious activities that life will demand by rehearsing their daily movements (Norman, 2014).

In his book *Homo Ludens* (Person Playing Games), published in 1938, Huizinga argued that these definitions about the game are not wrong, but incomplete and lacking in depth. According to the cultural historian Johan Huizinga (1872-1945), who argues that the beginning of everything that belongs to human beings is “play”, play has an undeniable place in the emergence of all important forms of life (order, law, commerce, art, craft, wisdom, poetry, science... ). Huizinga underlines that when an in-depth solution of human actions is made, it will be concluded that all human actions are just games (Huizinga, 1970). For this reason, Huizinga argues that these definitions about the game are made with the “measurements of experimental science” and miss the main meaning of the game. For Huizinga, play, even in its simplest form, is more than a physiological response.

The question remains: What is the fun part of the game? According to Huizinga, the main meaning of play lies in its origin, its intensity, its power to provoke. Nature could have chosen to take all the energy it has bestowed upon living things in more mechanical ways. But nature has given the game to living things with excitement and joy. When we examine the etymological origin of the word “game” in different languages, the enjoyable aspect of the game shows itself as holism (Huizinga, 1970).

Considering the concept of holism, we can define play as the act of creating an order. Each game has its own rules and layout. “It creates temporary and limited perfection in the imperfection of the world and the confusion of life” (Huizinga, 1970). The game exists to establish the order of the universe. This is clearly seen in holidays and festivities. These rituals are activities to take nature with itself and to maintain the order of the universe. “Mankind, in the words of Leo Frobenius, plays the way it comprehends the order of nature” (Huizinga, 1970). Human societies express the ways of interpreting life through games. According to this understanding, culture develops in the game environment. In fact, culture takes on an identity that hides the game over time. Huizinga, who argues that culture is born in the form of a game and is something that has been played since the beginning, mentions that social life is formed by being represented by games. The culture-creating function of the game shows itself as holism. The way people shape the cultural life with their actions and play their game creates a holism in themselves.

Caillois supports the cultural creative function of the game, which Huizinga defends, in "Man, Play and Games", which has an important place in the game literature. In this book, he creates a game theory and classifies the games. According to Caillois, who examines how games become a component of daily life, play reconstructs the nature of the unknown in its place in daily life (Caillois, 2001). The game, which is a common feature of rituals in pre-modern societies, becomes one of the components of daily life by enabling the players to participate in it. When we look at the concept of game as a function that creates culture, we see that game produces culture in various ways. Play can create culture by producing beauty, but it can also transform into culture by not producing any aesthetic value, but only by physical, moral and spiritual values.
According to Donald Winnicott, who works on child psychology and psychoanalysis, play is neither related to external reality nor internal spiritual reality (Winnicott, 2005). Winnicott searches for where the game is in his book Game and Reality. As a result of this search, he discovers that the game is a field of creation and this situation is important in creating one's own personality. Winnicott highlights that playing games is a person doing something. Furthermore, playing a game is "doing". Doing here is a concept related to the discovery process of human which one explores oneself. Winnicott says that with the creative physical and mental activities seen in the game, the doors of real experience are opened and this experience forms the basis of the self-sense of the human being (Winnicott, 2005). Because the play is an act of doing in itself.

The game is where the real experience happens. While playing games, people discover how to do something, to be creative, and thus have their own real experience. According to political philosophy thinker and educator Agamben, the biggest problem of modern human is the absence of real experience. Modern human returns home after having lived many events and exhausted, but he cannot transform any of these events into experience (Agamben, 1993). Routine daily existences in big cities blunt the experience ability of human being. Agamben, who argues that the childhood period should be examined in order to create a theory of experience, reveals the dominant role of play in the experience of childhood.

**Designing Playful Utopias**

In the architecture history, there are some projects which mostly imagine a holistic urban planning designed in accordance with the principles of the play. After the Second World War, the utopias that created an architecture that wanted to dominate the order and put the space on the center, were filled with the visual productions of the artists, architects and urban planners of the period which consist of the slogans such as "playful life" and "real experience". The common aspect of these intellectual movements, which articulate the development of a new type of space, is that they reveal playful arrangements that allow creative actions in daily life.

One of the most important playful utopias that build its design on the concept of game is New Babylon. The Situationist Definitions declaration published by Constant Nieuwenhuys (1920-2005) and the French thinker Guy Debord (1931-1994) in 1958 speaks of a holistic city plan that describes a new form of society. Constant visualizes the main principles of this declaration in his utopian city project called New Babylon (figure 1 and 2). The project, in which creative actions are the focal point of the design, advocates a world order in which the production system is automated, the employee gets rid of obligatory activities and turns to play and creative actions, and thus begins to explore his/her existence.
The creative effect in the game is one of the most important factors in the reshaping of the environment in New Babylon. Constant explains this with the example of homo ludens’ exploration of the environment. *Homo Ludens* first begins to explore his/her surroundings. He/She recreates its environment every time according to new needs. In this case, the discovery and creation of the environment are intertwined. This is because *Homo Ludens* is trying to explore his/her own creation while creating the space to be discovered (Constant 1960).
Constant’s idea of New Babylon, which is an ideal city design based on the instinct of creation, turns upside down the soil bound understanding of life. In New Babylon, which has dynamic and unlimited spaces thanks to the creative actions that will take place in it, people are freed from all ties that restrict themselves. New Babylon (figure 3 and 4), which is like a dynamic labyrinth in Constant’s words, depicts a city that leaves all utilitarian activities behind, only staging the results of the creative and transformative effect of the game.
Another group that stands out with its game-oriented urban designs is Archigram (1961-1974) which consisted of architects led by David Green and Peter Cook. Constant’s automatic production in *New Babylon* is also an indispensable element of Archigram’s urban projects. The main feature of their production is that they shape the urban environment they create in their projects on individual preference, participation and technology. Archigram that exhibited the *Living City* in 1963, firstly focused on mega-city designs based on entertainment. In this sense, they provided many examples. The well known of these and considered as the summary of Archigram’s ideas in the early years is *Plug-in City* (figure 5), designed by Peter Cook.

In this project, Archigram depicts a playful city in which people will participate at every stage. It imposes an active role on the individual in the formation of space. This situation drags the citizens into creative actions as in New Babylon. Here, the units are formed with a system that is shaped according to the wishes of the individual. This creative position of human in the space puts the space into infinity, a state of continuous becoming and transformation. This situation enables dynamic spaces to emerge, as in Constant’s utopia. It highlights the concept of “play” by creating structures that spaces can be attached to later, emphasizing the concepts of flexibility and fluidity.
Integrating the playful utopias with the learning spaces

Considering the close relationship the game establishes with experience, it may make sense to imagine it in progressive education. When we realize that the transforming form of education also intends to establish such a relationship with experience, we can see that the fact which the aims of the game and education are intertwined becomes even more evident. According to Dewey, one of the most important ideas of progressive education is that it needs an experiential philosophy of education more than those who wanted innovation in the past. This educational philosophy belongs to an education that takes all its resources from experience, realizes it through experience and is taken for experience (Dewey, 1963).

In progressive education, learning is an active process in which new meanings are created by putting new information on pre-existing knowledge and by constructing a relationship between the old and the new (Naylor and Keogh, 1999). During this active process, signification and experience are intertwined. Giambattista Vico argued that people can only thoroughly understand what they build on their own (Hanley, 2005). At this point, the similarity between progressive education and the concept of game in the context of experience is striking.

Another intersection point where learning establishes a similarity with play is the element of discovery. Piaget emphasizes that the foundation of learning is discovery. According to Piaget, understanding is essentially discovering or reconstructing it by reinventing it. The relationship that the next generation will establish with creativity will be through learning the process of constructing information through discovery (Piaget, 1971). Thus, the element of discovery which comes from the curiosity, seems a vital step to increase the potential of creative actions and connect the person to the game. For this reason, it can be said that the relational structure established by the experience in play with the concepts of exploration, memory, dreaming and creating is also a necessary structure for progressive learning. Moreover, these learning methods turned out to be similar in many respects to the latest principles discovered in research on human learning (Gee, 2004).

As a Conclusion

Regarding the common playful philosophy of the urban utopias, it is clearly seen that they all give a vital role to play to construct the whole daily actions in the city. These actions based on play, shape the program of the city life while letting people to “play”. In this sense, play is not just a basic physical action, but a holistic meaning which covers experience, wonder, creativity, memory and to enable people to construct and reflect their own, unique characters. The most striking element of the game is that it is an act of creation in itself. This act of creation, which even includes the concept of experience, is based on the person turning the uncertainty into order while playing. One of the most basic features of the game, which is also included in the field of aesthetics, is the desire to create a regular form (Huizinga, 1970).

These utopian projects with a transformable city plan, which are open to use in different ways foreseen for the new human profile in the future, can be changed and designed with different parameters according to the user, have a very high potential in terms of play, as they center free and creative actions and have uncertain spaces that keep the discovery factor alive. When we reconsider the philosophy of learning and the question of what the learning is, it can arise that the philosophy of learning has a close relation with the philosophy of play. Therefore, the most comprehensive conclusion that can be drawn from this is that when imagining future learning space designs, we should consider the close relationship the game establishes with the act of creation as in these holistic urban plans in terms of the concepts of participant, active relation, experience, creativity and basically “acting”.

At that point, rethinking the learning spaces through the philosophy of play can enable to imagine an experimental environment for learning. In such an environment, as the students construct the knowledge and the relationships, they will actually enter a self-discovering construction process. Thus, it seems that they will no longer be another brick in the wall, it is time to find their chi and to transform into an active character as in the Kung Fu story.
References


