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Navigating digital skills contradictions with boys' secondary school students: The teachers' perspective

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Abstract

Students' digital skills development seems to be a pertinent issue as we progress into the fourth industrial revolution (4IR) and involves student readiness for Education 4.0. However, literature pertaining to digital skills development is often positioned in Higher Education (HE) and often reports on the lack of students' digital skills. Factors such as poor infrastructure and insufficient teachers' continuous professional development (CPD) have been reported as reasons for this underdevelopment. However, in the United Arab Emirates (UAE), government schools are well-resourced and serviced by digitally skilled practitioners who are regularly offered CPD, yet students' digital skills still seem underdeveloped. As such, this paper aims to add to the discussion in the literature by focusing on secondary school teachers' perspectives on the challenges they face when developing students' digital skills. Underpinned by Cultural Historical Activity Theory (CHAT), the study employed a case study methodology using semi-structured group interviews with four teachers from Creative Computer Design and Innovation (CCDI), English, Math and Science. Themes relating to the lack of students' digital and basic literacy skills, students' attitudes and behaviours, and organisational policy emerged as challenges teachers experience whilst trying to develop students' digital skills. Consequently, the paper recommends addressing these challenges through policies that work in tandem with each other to improve digital skills within this and wider contexts.

1. Introduction

In the rapidly evolving landscape of education, digital skills could arguably be considered indispensable. As we progress through what authors such as Miao et al. (2021) refer to as the fourth industrial revolution (4IR), educational institutions face the critical task of equipping students with the necessary competencies to be able to do so. The literature surrounding digital skills suggests there remains a gap that discusses challenges teachers face when developing these in students. This field of research is further signified by authors such as Nalaila et al. (2022); Wild and Heuling (2020) and Youssef et al. (2022) who suggest digital skills are being under-taught in secondary schools and push for further research to occur. Research is necessary from this perspective since teachers are ultimately responsible for developing these skills in an educational environment. This becomes particularly important when authors such as Miao et al. (2021) suggest the 4IR era sees the age of digital technology, the internet and, more recently, artificial intelligence (AI) transforming practices across all sectors.

The Ministry of Education (MOE) in the United Arab Emirates (UAE) has attempted to address the above through its public schools by investing in all schools infrastructure and continuous professional development for staff (CPD). For example, all staff and students are provided with a digital device equipped with Microsoft Office accounts and high-speed 4G networks in schools and teachers are provided with the relevant CPD relating to technology use for learning (United Arab Emirates Ministry of Education, 2023). It could, therefore, be argued that technology use within such establishments would be highly functional for both teachers and students since these infrastructures and teachers' digital skill sets have been reported to impact the effect of the use of technology (Nalaila, et al., 2022; Weninger, 2022). However, from working in one of the boys' secondary schools, anecdotal evidence suggests this is not the case. Furthermore, in previous research conducted by Bihal (2023) in the same institution, teachers reported confidence in using technology for course administration and teaching, but were less confident in student use of technology, especially for creativity and research. Such findings are of interest to the author since they raise questions about why teachers felt less confident in students' use of technology. If digital skills are to be developed, a necessity arises to identify factors impacting this process. As such, this paper attempts to both build on the author's previous work within the same institution and existing literature by further

examining through semi-structured interviews factors impacting teachers in developing students' digital skills in secondary schools.

To investigate the phenomenon discussed, this paper adopts a theoretical framework underpinned by Cultural Historical Activity Theory (CHAT) and was selected due to its ability to provide a holistic approach to investigate systemic tensions occurring within an activity system. Furthermore, this paper is particularly interested in identifying the contradictions, defined as "historically accumulating structural tensions within and between activity systems" (Engeström, 2001, p. 137), since previous research by the author indicates teachers have limited students use of technology in lessons, indicating some form of contradiction(s) exists.

As such, this research paper proposes the following research question:

- *RQ:* How do systemic contradictions create challenges for teachers in developing students' digital skills in a boys' secondary school?

The research aims to enhance the discourse surrounding 21st-century digital skills by examining teachers' perspectives on factors influencing their ability to foster these skills in students, thereby addressing a literature gap. This will be addressed in the subsequent sections through a critical review of existing literature, a rationale for the chosen theoretical framework and research design, and an analysis of their activity system to identify teachers' institutional challenges. The discussion will critically assess the findings by considering the current literature on digital skills development and teaching challenges, reinforcing the study's contribution to the field. The paper will conclude with its practical implications, originality, limitations, and future research directions.

2. Literature review

The scope of the literature review aimed to establish the challenges teachers in secondary schools face when developing digital skills with secondary school students. Such literature was difficult to identify; authors such as Youssef et al. (2022) and Bergdahl et al. (2020) argue that themes such as digital skills and technology-enhanced learning have been underrepresented in the literature, which highlights and raises questions about the neglect of this area. Given the sparsity of the literature. A comprehensive search was conducted on Lancaster University OneSearch and Scopus

employing a range of search terms, including “challenges students” and “challenges teachers” against “digital skills”, “digital skills development” and “ICT use”. These were filtered based on the following criteria: full text online, peer-reviewed journals, articles, book chapters, date range 2019-2024 and students generating 244 papers. After reviewing titles and abstracts, 12 papers discussing digital skills and challenges across secondary to tertiary education were selected and discussed below.

2.1 Defining digital skills and students’ attitudes and behaviours

The literature reveals the multifaced nature of digital skills, which includes students’ attitudes and behaviours, for example, Erdogdu and Erdogdu (2023) highlight the significance of students’ positive attitudes and interest in ICT as factors that determine their digital skills development, while Bikowski and Casal (2018) highlight the need for students to not only be motivated with learning with digital tools but also be prepared through exposure to such tools. As such similar to Bergdahl, et al. (2020), this paper defines digital skills as,

... existing on a graduated continuum from basic functional skills to a higher level, specialist skills ... ‘digital skills’ refers to a range of different abilities, many of which are not only ‘skills’ per se, but a combination of behaviours, expertise, know-how, work habits, character traits, dispositions and critical understandings (UNESCO, 2017, p. 4).

Acknowledging the wider definition of digital skills broadens the scope of this paper beyond students’ technical abilities to encompass how students’ attitudes and behaviours impact motivation and engagement in digital skills development and the impact this has on teachers’ ability to develop students’ digital skills. This narrative is important for this paper since literature relating to boys’ underachievement within the Middle East has been explicated by authors such as Ridge (2014), who argue that the lack of educational motivation is a significant factor in this phenomenon.

2.2 Digital skills and students’ academic performance

The literature indicates that digital skills impact student academic performance. For example, Nalaila et al. (2022) suggest that digital illiteracy leads to poor performance academically, indicating a direct link between digital skills and academic performance. Authors such as Bhandari et al. (2021) suggest importance should be given to having good access to ICT infrastructure in government schools to

build digital literacy. However, the validity of such claims is challenged by Nalaila et al. (2022). Meanwhile, Youssef et al. (2022) argue that intensity of use is a more significant factor in improving students’ academic performance.

These findings reveal the importance of being digitally literate for higher academic performance but also showcase contradictions in what supports the building of adequate digital skills for better academic performance, thus providing a problem space for identifying which factors are more of a challenge for teachers when developing students’ digital skills.

2.3 Digital skills and students’ technical abilities

A school of thought from the findings suggests that students already possess digital skills. Some of this literature is positioned in Prensky’s (2001) work, which identified three categories of technology users; digital natives (users who are fluent in technology use), digital immigrants (users who learn to use technology) and digital refugees (users who are forced by their organisations to use technology) (Khoza, 2023). Gómez-Poyato et al. (2022) posit that students identify as digital natives, while teachers identify as digital immigrants. Their findings argued that students have agency towards their learning when technology is used since this generation lives in continuous interactivity from various social networking mediums. However, they also found that students struggled with giving device-specific instructions, unlike teachers. They postulate this to be related to how devices now function as computers and these computer skills are missing in students which is further mirrored in the findings of Karunanayaka et al. (2021). This highlights a significant missing skill set for students working with computers in which more complex functions would require training. Youssef et al. (2022) support this perspective, suggesting that familiarity with digital technology as a digital native does not automatically develop digital skills that are required for ICT use and learning. Instead, they argue that students need specific training and appropriate education strategies.

These findings again indicate the conflicting evidence relating to the debate on digital natives, but they do provide insights into where students might be proficient, for example, using devices for social networking purposes but not for academic purposes. The implications for this paper indicate the need to explore whether being a digital native has a significance on teachers’ ability to develop students’ digital skills, since students are provided with laptops from grade seven, and so by secondary school students should have the basic level of competence to use technology for learning.

2.4 Policies and frameworks

Digital skills are often implemented into organisations' policies, frameworks and curricula, which are often underpinned by international organisations' recommendations, such as United Nations Educational, Scientific and Cultural Organization's (UNESCO) Digital Citizenship and Information Communication Technology (ICT) Competency Framework for Teachers. Much of the literature often argues for better integration of these frameworks into the curriculum and to provide teachers with strategies for how the desired digital competencies are specifically integrated and instructed in the classroom (Wild & Heuling, 2020). This is further supported by Kuhl et al. (2019), who suggest policies relating to digital practices, and pedagogy need to be designed to develop learner agency when using technology. However, Weninger (2022) highlights the challenges faced by teachers through this decontextualised approach. These nuanced aspects of policy signify the importance of addressing the significance of policy on practice relating to developing digital skills. This is particularly important in the UAE, where policy underpins all aspects of education, of which many policies have been adopted from the West and given the cultural differences (Miles, et al., 2021) may create contradictions in the activity system in which teachers operate. Furthermore, while the literature promotes integration, it seems to be missing a discussion of how policies from school operations to practices in the classroom may create conflicts.

In conclusion, the priority for this paper is to examine to what extent the already reported literature is significant within the current context being studied. Many of the papers discussed are not only contextualised within HE contexts but also from Western countries, which creates operational and cultural differences. Any differences and similarities will help to add to the existing debate surrounding students' digital skills development.

3. Theoretical framework

In this paper, the author aims to explore multiple views of participants whilst acknowledging that each view holds merit as the exploration of contradictions and challenges teachers face when developing students' digital skills is conducted, thus placing the author's ontological stance in interpretivism. Furthermore, since these views are shaped and formed through their interactions and experiences with

the social world in which the teachers operate, the author adopts an epistemological stance that aligns with constructivism (Egbert & Sherry, 2020). This paper is more specifically underpinned by CHAT, which has been selected for its ability to provide a set of concepts such as contradictions and mediation to analyse educational phenomenon (Bligh & Flood, 2017).

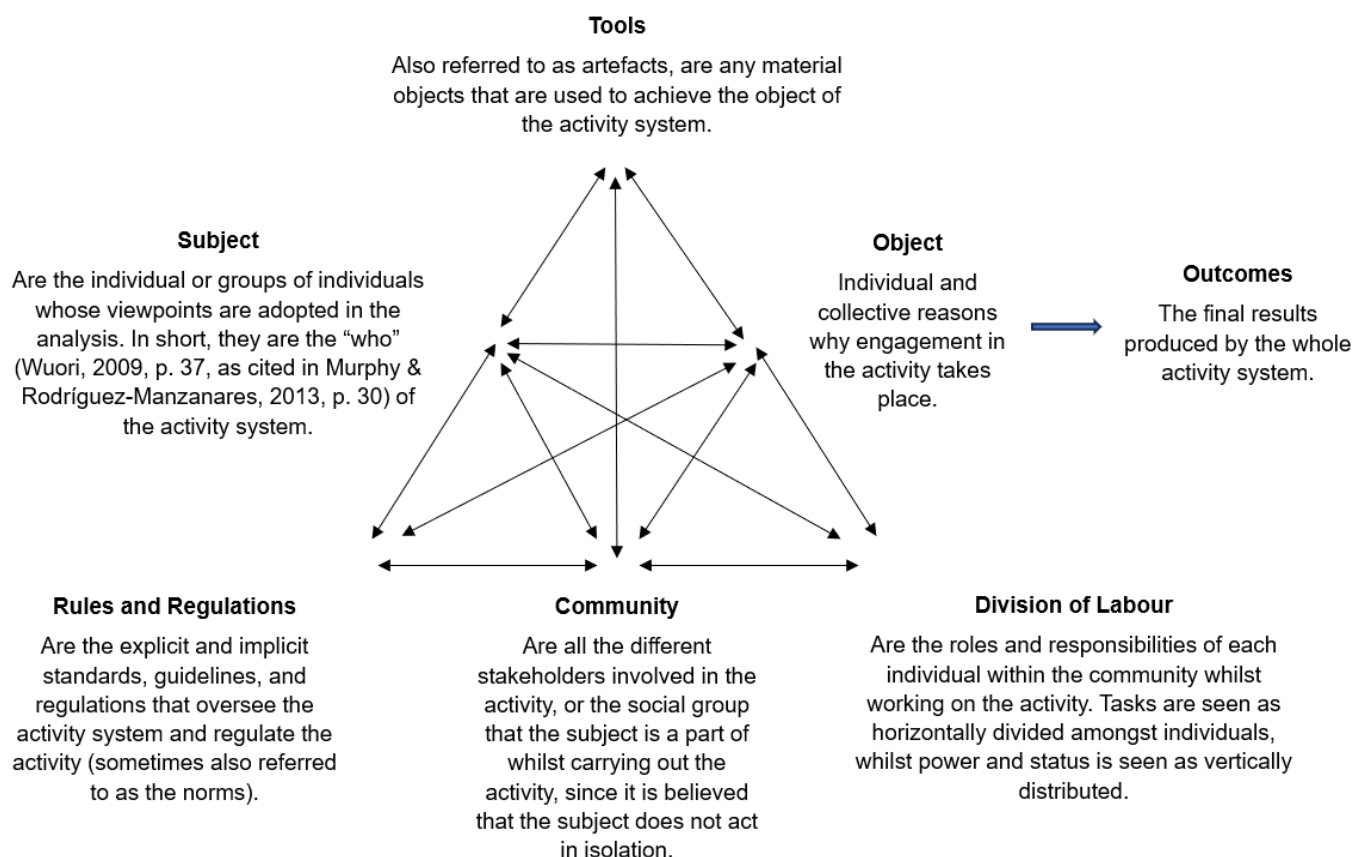
CHAT is considered the second generation of Activity Theory (AT) since it is Engeström's adaptation of Vygotsky's mediated action concept between the subject, object and tool (Al-Ali, 2020) to which Engeström adds a social dimension of community, division of labour (DoL) and rules (Joo, 2014). The activity system (unit of analysis) is often represented through an activity system model (ASM) (see Figure 1 for diagrammatic representation). The Vygotskian theory is rooted in cultural mediation, "which states that the human (subject) action on a part of the world (object) is always mediated by culturally developed artifacts." (Grimalt-Alvaro & Jaume, 2021, p. 2). Moreover, CHAT draws on,

Leontiev's (1978) hierarchical structure of human activity... activities are collective and motivated by the need to transform an object, which can be material or ideal (e.g. a problem or idea), into desired outcomes. This motive gives sense and direction to actions or chains of actions, which are carried out by the subjects (individuals or groups) and which are oriented toward specific or finite goals (Blin & Munro, 2008, p. 477).

This adapted version provides a sound framework by providing a structured way for analysing and understanding the complex interactions between teachers and their activity system when trying to develop students' digital skills.

Each element within the activity system can have mediating effects on each other, hence the use of double-pointed arrows in Figure 1. Any tensions between these elements can lead to contradictions within and between different activity systems, including between activity systems with partially shared objects. Thereby leading to challenges in a teacher's ability to develop digital skills with students. Identifying these contradictions can help to find resolutions and can also be a source of change and development (Gedera & Williams, 2016). Using Engeström (1987, 2001, as cited in Joo, 2014), four levels of contradictions can help organise data for analysis. These have been visually represented in Figure 2 and have been adapted from Bligh and Flood (2015).

Figure 1. Activity system model adapted from Engeström (2015, p. 63); elements defined based on interpretations from Murphy and Rodríguez-Manzanares (2013)



4. Research design

This paper employed an interpretive paradigm, which aims to present and analyse the various views of the different participants using a deductive approach (Bryman, 2012) when considering the challenges and contradictions teachers face whilst developing students’ digital skills in a government boys’ school in the UAE. Thus, enabling qualitative data to be generated through activity system analysis.

4.1 Case study approach

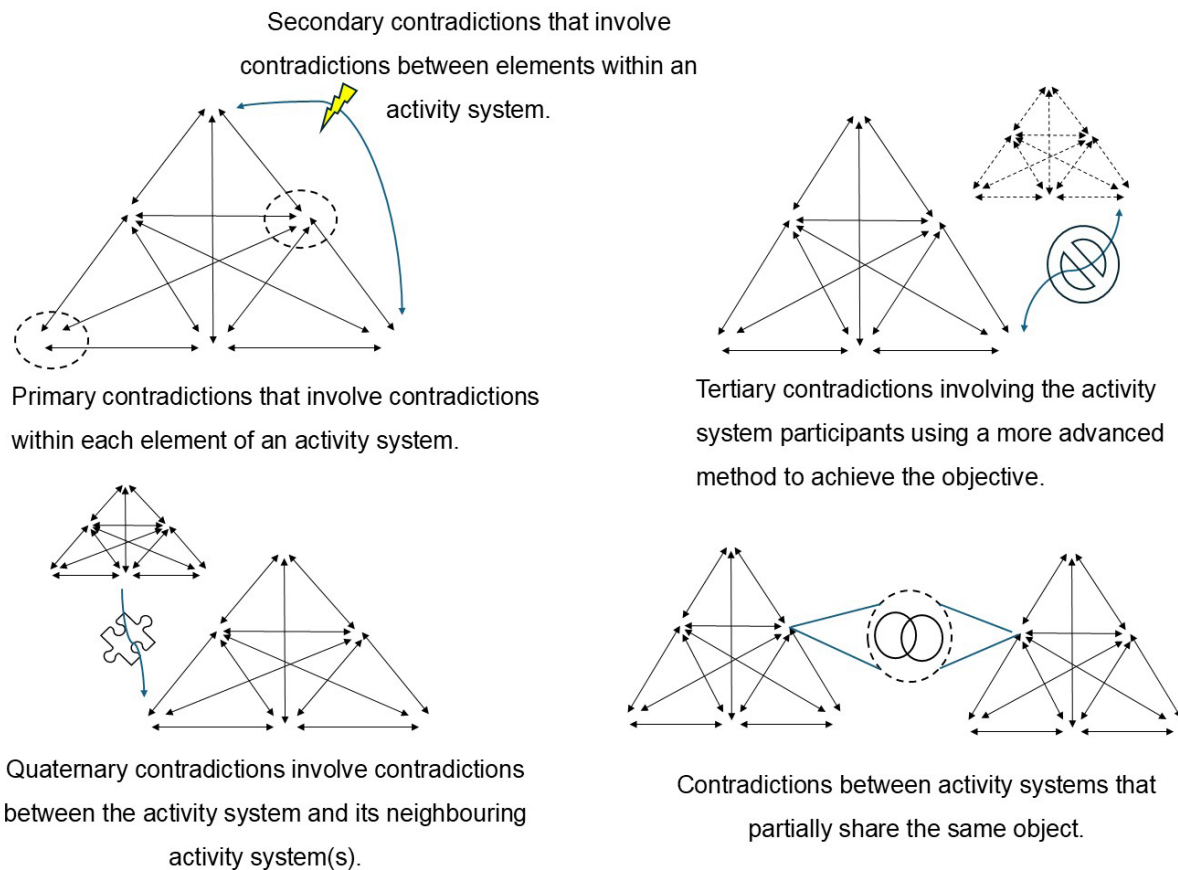
CHAT, as the theoretical framework, facilitates a holistic view of the activity system within this educational context and emphasises the interplay between its elements, which helps guide the identification of contradictions and challenges teachers may face when developing students’ digital skills. Informed by CHAT, the decision to use a case study design stems from the opportunity presented by this institution to study a current social phenomenon (Yin, 2018), which

involves real people in real situations being studied in a context (Cohen et al., 2017). Here, technologically skilled teachers in a well-equipped institution who instruct on a vocational program (grades nine to 12) face challenges and contradictions as they attempt to develop students’ digital skills, thereby making this the unit of analysis for the case study.

4.2 Sampling

In this study, teachers were recruited based on the criteria that align with the research objective in which teachers are directly involved in shaping students’ digital skills in the activity system under investigation. These criteria included teaching any subject in either grade nine or ten vocational programmes pathway, where students’ digital skills development is an integral part of the programme. Additionally, these teachers should have also previously reported a high level of competence in using digital tools.

Figure 2. Visual representations of contradictions within an activity system adapted from Bligh and Flood (2015) and Joo (2014)



Cohen et al. (2017) suggest that such a sampling approach should be considered purposive sampling, in which the sample is explicitly selected whilst fully appreciating its non-representativeness of the wider population. However, participants as activity system subjects offer insights into the complexities of teaching digital skills since activity system analysis is viewed through their lens. As such, nine teachers were emailed requesting their participation in a semi-structured group interview, of whom four agreed to participate. Three of these teachers were male and one was female. Three of them belonged to group A subjects (subjects that contribute towards students' final grade point average score (GPA) of Math, Science and English, and one teacher belonged to group B (subjects not included in the GPA score) of Creative Computing Design and Innovation (CCDI).

4.3 Insiderness

The researcher has a presence in this research as an insider since she works in this organisation as a teacher and is privy to the intimate workings of the institution. Taking

an insider approach to the research can have both positive and negative implications for the interview outcomes. As an insider, answers can be verified and developed to increase reliability and validity. However, there is a chance of the interviewer effect occurring which could skew the results. By conducting a group interview, it is hoped that a safe enough environment is created for all respondents to speak openly.

4.4 Data gathering

A group interview was conducted to foster an environment where participants could share diverse perspectives, contribute to ongoing discussions, and reveal their level of agreement or disagreement with each other. Such an approach allows for a detailed account to be provided and allows the researcher to cross-check for answers, adding to the validity of the information (Cohen, et al., 2017).

The interview questions were guided by the principles presented in Mwanza-Simwami (2011) relating to the Activity-Orientated Design Method (AODM). From the toolkit,

methodological tool number three (the technique of generating research questions) was adapted to generate more focused research questions that allowed for the examination of teachers' interactions within the activity system to identify both the contradictions that teachers face when developing students' digital skills in addition to potential themes.

The group interview was conducted via Microsoft Teams, and participants verbally answered questions and used the chat function to contribute points. Questions were distributed beforehand in both English and Arabic translations. The interview was recorded on Teams, and the interview transcript was obtained for analysis.

4.5 Data analysis

Thematic analysis was the initial step in the data analysis process. It was used to first identify teachers' activity system (Figure 3) and then the key challenges teachers face when students use technology in the classroom. Due to the word count limit, only the top four out of the seven themes were discussed in this paper. Contradictions within these themes were then identified using the CHAT levels of contradiction.

4.6 Reliability, validity and bias

The same interview questions were presented to all participants and shared before the group interview to standardise the procedure and ensure reliability. Probing questions were tailored around the key questions during the interview to avoid any interview bias. As mentioned previously Insiderness was used to authenticate answers to ensure validity of results.

4.7 Ethics

Lancaster University approved the research, deeming it low-risk. The interview recordings and transcripts have been saved in a password-protected folder. Furthermore, during the analysis phase, all participants' names and any specific references to individuals or the organisation have been coded to provide anonymity and minimise the risk of identification. Participants were also given one week to withdraw their answers following the interview.

5. Findings

The following section has been composed using CHAT's activity system analysis and the four levels of contradictions from the group interview. The findings begin with the teachers' ASM, which is analysed to demonstrate the essential

components relevant to this study. Building on this, the four levels of contradictions identified have been presented to reveal challenges faced by teachers in developing students' digital skills. By presenting the findings in this manner, a structured analysis is aimed at addressing the research question.

5.1 General activity system of teachers as the subject

Figure 3 presents the conceptualisation of the general ASM of the *teachers*, who represent the subject element in the model. Teachers have been identified as the subject since their role within the activity system is to implement the object for their respective curriculum (Math, English, Science, CCDI) within the vocational programme whilst developing students' digital skills.

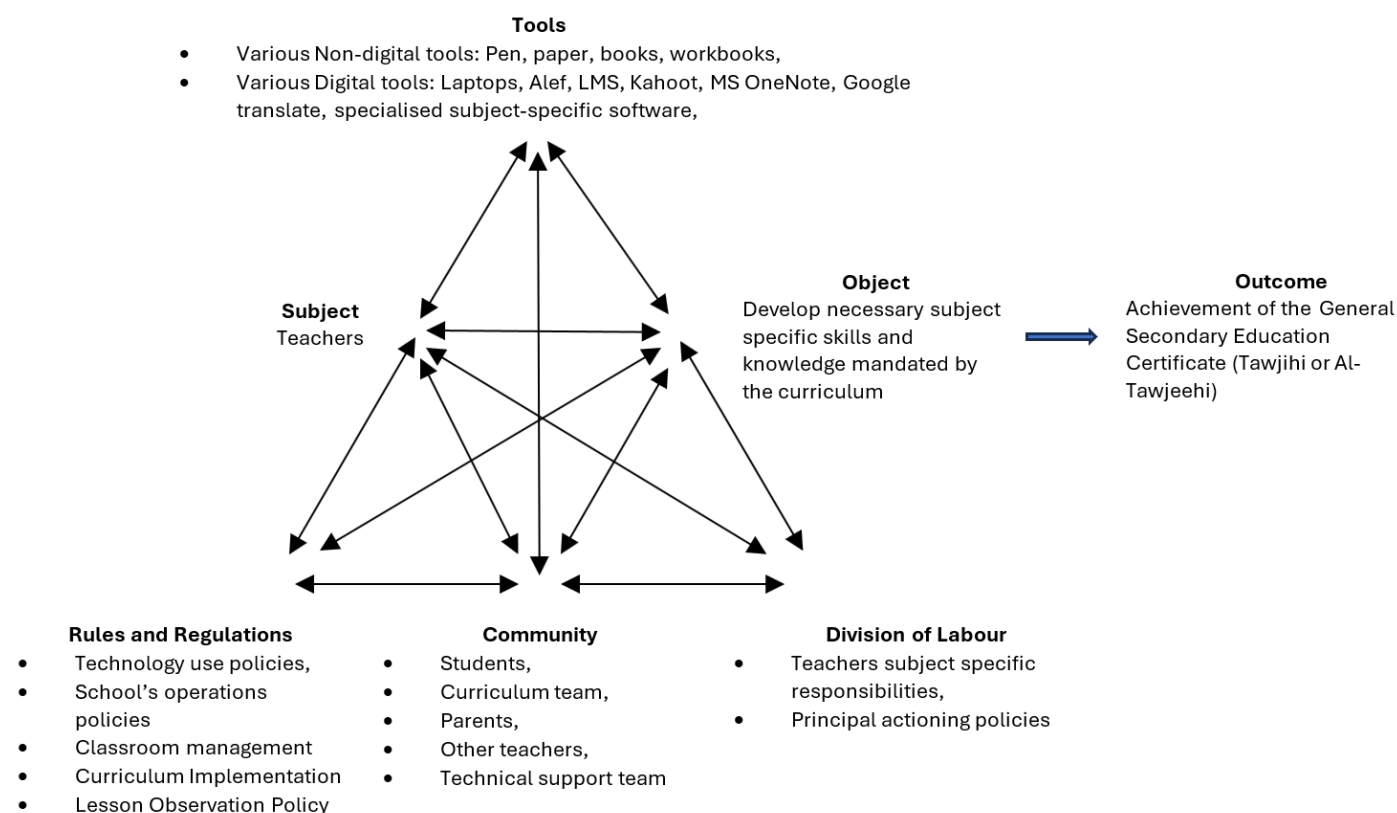
5.2 Object and outcome

Interview question one asked participants to explain their main and intended objectives and outcomes of their teaching and learning strategies. The results demonstrate that teachers' objects align both with the object of the activity system "...the curriculum is asking me to deliver these points and I'm delivering that..." (Participant 1) and incorporate more **goal-oriented actions** for their respective subject specialisms "...not only to *finish the curriculum* but to **remember something**...", (Participant 4). Participants also agreed that the tangible end outcome of their object was related to the *achievement of the General Secondary Education Certificate*.

5.3 Tools

Teachers identified *various digital and non-digital* tools they used to achieve their object. Aside from mandatory tools such as *specialised subject-specific software* used in CCDI and *Alef* used in English and Science, the remaining tools are based on the teacher's preference to engage with them based on their judgement of how to achieve their objectives. For example, Participant 4 explains, "The basics are reading and writing, then you go next level...This is a main reason why I don't use technology. I use the book and try things so they... can know how to write." Thus, highlighting the significance of foundational literacy skills compared to digital skills as being the most significant factor in achieving their object.

Figure 3. Teachers' Activity System



5.4 Rules and regulations

Teachers identified different rules and regulations that mediate their activities. For example:

- The *technology use policy* restricts which websites are accessible to students and teachers and regulates software installation on laptops as we as login requirements for Microsoft accounts and laptop devices.
- School operations policy*, which mandates the number of students per class.
- Curriculum implementation* stipulates the mandatory curriculum to be delivered for assessment and the optional development of digital skills as part of the 21st-century learning framework.
- Lesson Observation Policy* which sets the standards for teaching and learning in the classroom.

5.5 Contradictions relating to students' digital skills deficit

Whilst teachers recognised students' capabilities with technology, for example:

- Participant 2 says, "I have given them like Power-Points to make and they can do it, but again, it's difficult for them", and
- Participant 3 says "...they use the technology as social media things and these application, but they don't use it in the way that is advanced...that might benefit them".

Students' digital skills deficit was identified as the most commonly occurring theme relating to challenges teachers face when trying to develop students' digital skills (n=19 references throughout the transcript).

They also highlighted skills they felt students lacked (Table 1), which, when compounded, creates a quaternary contradiction between the teachers' and students' activity systems (Figure 4). This is exhibited as a primary contradiction in the tool element of the students' activity system, where students lack basic digital literacy to use various technologies, creating tensions in the teachers' activity system in the tool element of using different technologies with the students.

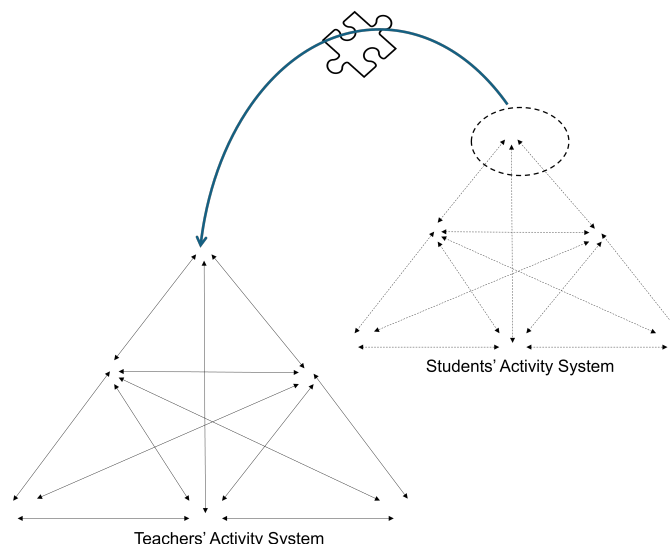
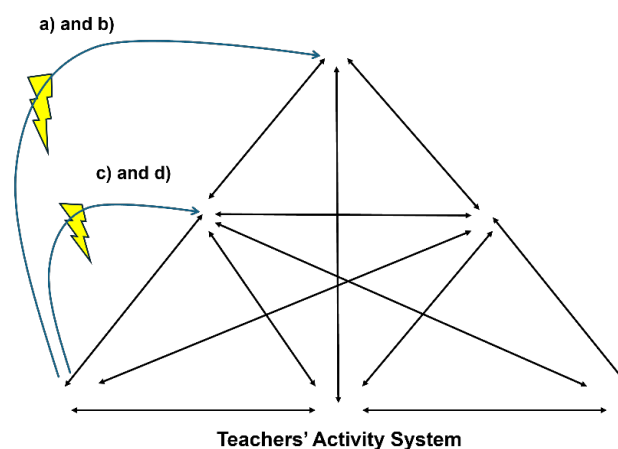
Table 1. Identified digital skills deficits: insights from teachers

Category	Specific areas
Software	Make or use Word and Excel documents Difficulty using PowerPoint
Hardware	Use a computer or laptop
Store and locate documents	Save a document (5 references) Open a folder
Document Design	Insert pictures. Change the font size Change the font colour
Navigation	Locate the desktop (2 references)
Internet Skills	Clearing the browser Switching between browsers Research skills (2 references) Information selection Confidence in selecting appropriate websites Agreeing to terms and conditions. Faulty information on the internet (2 references)
Solving Technical Problems	Problem-solving skills Troubleshooting skills Reading error messages

The resulting impact highlights teachers abandoning or limiting students' use of technology during lesson times, since these skills do not naturally exist in an individual and must be taught, thus creating time conflict between delivering lessons to achieve academic outcomes or achieving digital skills. This leads to the underdevelopment of students' digital skills since it could be argued that using a digital device for learning entails an entirely different skill set compared to using social media or gaming skills, where students demonstrate competence.

5.6 Contradictions relating to organisational rules and technology use

Organisational rules were identified as the second most commonly occurring theme throughout the transcript relating to teachers' challenges in developing students' digital skills (n=15 references).

Figure 4. Visual representation of quaternary contradiction between students' and teachers' activity system**Figure 5. Visual representation of secondary contradictions arising in the teachers' activity system**

Several secondary tensions were identified in the teachers' activity system, which related to teachers' use of technology with the student, as highlighted through the teachers' transcripts in Table 2 and represented in Figure 5:

- Between the rules of *technology use policy*, which blocks the use of websites not authorised by the organisation and tools *using various technologies* with the students for various activities, as highlighted by Participant 3.
- Between the rules of *curriculum policy* for the required platforms and the various *subject-specific software (tools)* that are not fully subscribed to by the organisation, as highlighted by Participant 1.

- c. Between the rules of *curriculum policy* to use technology and the subject in which the teachers believe technology is not necessary to achieve the learning outcomes as highlighted by Participant 4.
- d. Between the rules of *schools' operations policy* relating to class size and the subject where the teacher desires to support students when using technology is impacted due to large numbers, as highlighted by Participant 2.

These tensions across a range of policies lead to several barriers, thus resulting in teachers either limiting or abandoning the use of technology. What seems interesting is that these policies are in place to encourage effective and what could be classed as safe use of technology, however, in this context, it seems to be having the opposite effect, especially when they conflict with each other. Furthermore, these

challenges feed into teachers' beliefs around the effectiveness of using technology, resulting in adaptations to the curriculum delivery to be made that do not incorporate tech-

nology to achieve the overall objective. However, teachers feel penalised for doing this, as highlighted by Participant 4 (Table 2).

5.7 Contradictions relating to students' attitudes and behaviours towards using technology

Students' attitudes and behaviours were identified as the third most common theme throughout the transcript regarding teachers' challenges in developing students' digital skills (n=12 references).

Only Participant 1 gave a positive example of student engagement with technology relating to student behaviour and attitudes. "Sometimes you will find students want to finish before someone else, and like there is a competition between them, so they try to solve the problem quickly without waiting for the teacher to come to them." Suggesting competitive environments help in creating student agency whilst using technology.

Table 2. Organisational rules relating to technology uses that highlight challenges for teachers

Participant	Transcript segment	Related Policy
3	"Everything blocked, so even if you want to research something like somehow so many websites are blocked, they need to use VPN which is not allowed."	<i>Technology Use Policy</i>
1	"...[we are] limited [to] platform and with this platform we cannot get all the features based on the subscriptions...So the blockage with internet, also the subscription of like website or applications and these things that we use in technology, give us problem in using technology"	<i>Technology Use Policy</i>
4	"I gave one...good class... The students understand, the students learn and they write. I gave them examples. They did it all...but...my main problem. I didn't do any technology. You see I get a bad review because I didn't use any technology..."	<i>Lesson Observation Policy</i>
2	"Yeah, the numbers have a very big influence on using technology in the classroom as well... You have to baby them and show them exactly how to do every single thing, so that's possible in the smaller classes, but in a big class, not at all."	<i>School Operations Policy</i>

Table 3. Student attitudes and behaviours towards using technology: insights from teachers

Participant	Transcript segment
1	"... they use technology because as a subject that I'm teaching, they have to use technology, but they will use it...to pass and to get the marks of this activity or whatever they're doing, not because they want to learn it."
2	"They just want to get the answers done so they can get a 60 or 100 points unless that changes and they actually want to learn...its going to be difficult to use technology in positive way"
3	"But when we are forcing them to use technology like this...they're not going to do that...They are not going to like to...use it or...learn from it or help them in their studies."

Whilst the former lends a positive insight, a contradiction exists between the partially shared object between the students and teachers (Figure 6). In this instance, both teachers and students are working towards the outcome of achieving the General Secondary Certificate in Education. However, the shared object conflicts with one another in which the teachers want the students to develop *subject-specific knowledge and skills to pass assessments*, while the students' object is to achieve the marks (Participant 2, Table 3) and pass (Participant 1, Table 3) without the necessary learning.

The challenge this poses is that if students only want marks and to pass, they will not see the relevance of developing digital skills since it has no impact on their object, even with forced practices, as highlighted by Participant 3 (Table 3). Thus, they will not engage with technology, and so again, teachers will either abandon or limit its use since the lack of engagement will result in lost learning.

5.8 Contradictions relating to students' academic ability

Students' academic ability was identified as the fourth most commonly occurring theme related to teachers' challenges when trying to develop students' digital skills (n=9 references throughout the transcript).

Figure 7 represents two levels of contradictions as follows:

The first highlights a quaternary contradiction between the students and teachers activity system, where the source of tension exists between the subject element in the students' activity system (lack of students' basic literacy skills), which then impacts the tool element in the teachers' activity system (students' capability of using technology). This results in tension within the teachers' activity systems within the elements of tools (using technology) and the object (developing knowledge, skills and curriculum completion) as highlighted by Participant 4 and 1 (Table 4).

Figure 6. Visual representation of contradiction between the partially shared object between the teachers and students

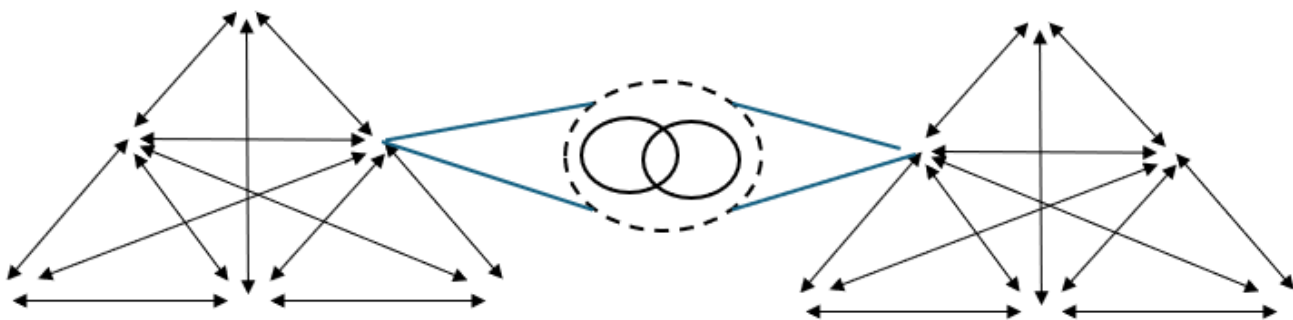
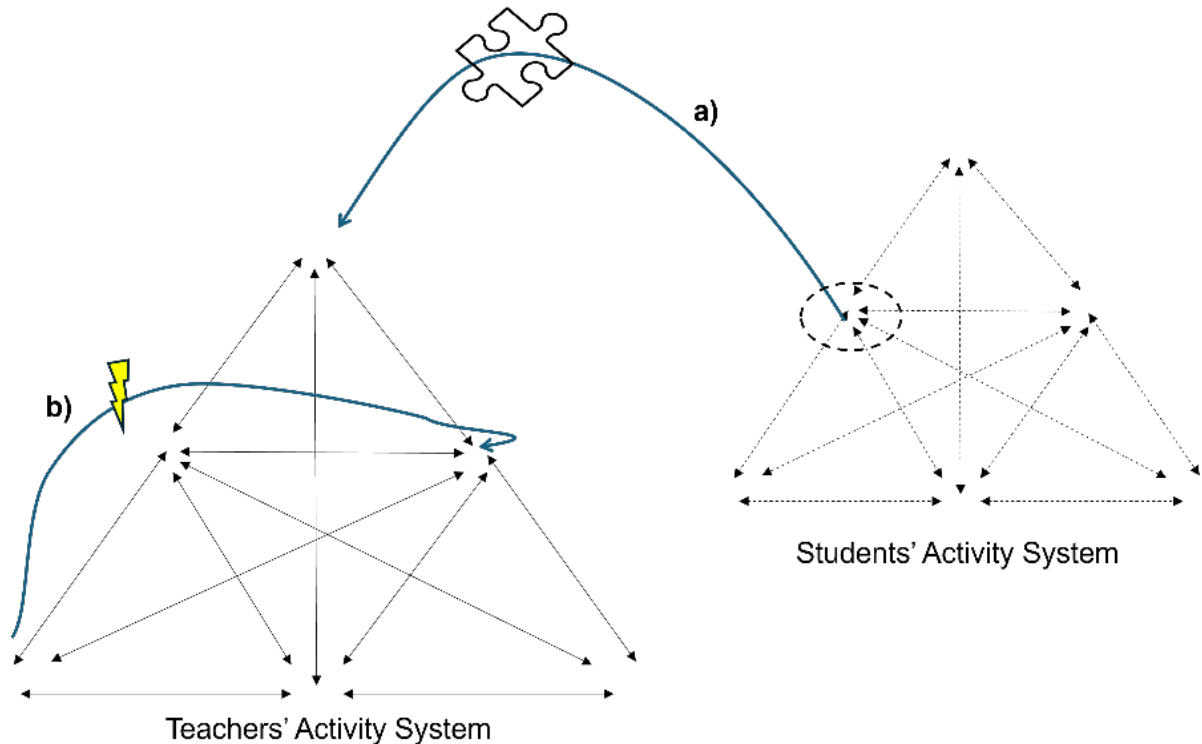


Table 4. Challenges faced by teachers regarding students' basic literacy skills and technology use

Participant	Transcript segment
4	, "...only if someone has...the basics. OK, he can read, he can write this. Then we move on to technology...for example, they like Kahoot because it's only click but they don't know the question. They don't know how to read unless I read for them that question"
1	"...they need to write, they don't have the literacy skills to read and write, even like when you ask some students, for example, to sign up in a website, they need, you need to like [explain] step by step, press this, do this do that."
2	"it's difficult to teach them from scratch because if you're trying to cover the curriculum and teach them how to save a document, you don't have enough time."

Figure 7. Visual representation of a) quaternary contradictions between the teachers' and students' activity system and b) secondary contradiction in the teachers' activity system



The second highlights a secondary contradiction in the teachers' activity system between the rules (time constraints from the curriculum), creating tension in the object (developing students' skills) as highlighted by Participant 2 (Table 4).

These findings indicate the interconnectedness of students' academic ability in basics such as reading, writing, and comprehension and students' ability to use technology, which impacts the teachers' ability to engage with students using technology in the classroom. For example, Participant 1 (Table 4) highlights the significance of students being able to read to navigate technology so that teachers are not burdened with the basic steps to sign in to a website, which reduces students' use of technology. This is further exacerbated by the secondary contradiction, as highlighted by Participant 2 (Table 4), in which a choice needs to be made between digital tools use and the time constraints of the curriculum, which leads to teachers abandoning technology. Overall, there is a clear tension between achieving the object of basic skills and subject knowledge versus digital skills, which leads to teachers prioritising the former since they are interconnected in achieving the overall object of the activity system.

6. Discussion

This paper started out by asking the research question: How do contradictions in a boys' secondary school create challenges in developing student digital skills? The results demonstrate that whilst these teachers are competent in using technology, multilevel contradictions occur during student use of technology, thus creating challenges for teachers to integrate technology, resulting in low student usage or total abandonment of technology in the classroom. Therefore, it is argued that students' digital skills are either not being developed or only a low level of development is occurring in subjects such as CCDI, in which the use of technology is mandatory.

6.1 Students' digital skills competence

The results of this study indicate the extent to which students in this context lack the basic digital skills to navigate technology for learning purposes (section 5.5). The lack of these skills has resulted in several contradictions for the teachers, thus leading teachers to either abandon or limit the use of technology with the students. Such adaptations have resulted in the underdevelopment of students' digital skills. The literature argues that as digital natives, students have

the necessary skill set to use technology (Gómez-Poyato, et al., 2022), however these results highlight that students do not possess those necessary skills needed for learning purposes. While Youssef et al. (2022) have suggested that students need specific training and education, what these findings indicate is basic digital competence is missing which should have been developed during primary school phase. Subsequently this impacts not only the subject of CCDI, which involves a complex technology curriculum that is difficult for students to grasp without the basic foundations, but also creates barriers for non-technology based subjects. It is recommended that further research should be conducted in primary schools to understand the contradictions arising in their activity system that stop teachers from developing students' digital skills.

6.2 Policies and digital skills

While the literature advocates for integrating specific policies for digital skills development (Nalaila et al., 2022; Wild & Heuling, 2020), the results seem to indicate that the UAE have a range of policies in place, and these policies can oftentimes cause significant disruptions for teachers when using technology. For example, there is a conflict between curriculum and technology use policies that restrict the use of certain websites (section 5.6). The conflicting nature of these policies indicates how various departments need to work more collaboratively together to ensure better integration of technology, which better supports teachers in developing students' digital skills. The use of contradictions in this case has clearly demonstrated how tensions arising within and between elements create challenges for teachers, and often, these challenges are beyond their control and lead to adaptations in their strategies and objectives.

6.3 Students' attitudes and behaviours

A significant finding related to students' object where teachers identified students' motivations lie in simply wanting to attain a pass (grade C) or marks through the curriculum they are following which is attained by developing or displaying subject-specific skills (section 5.7). In this case, digital skills are seen as add-ons to the curriculum, and if this awards no merit, students seem disinterested in learning these skills. These findings add another element to the literature, where students' positive attitudes are considered the most relevant factor in digital skills development (Erdogdu & Erdogdu, 2023; Nalaila et al., 2022). However, in this context, where students are what could be considered extrinsically motivated (Ridge, 2014) by marks, tangible

outcomes are required to motivate them to develop their digital skills. As such, policymakers, curriculum designers, and assessment teams need to factor in this contextualised element if better outcomes are to be achieved.

6.4 Students' basic literacy and digital skills

The literature seems to indicate digital skills have a positive effect on students' academic ability (Nalaila, et al., 2022). Factors that mediate this included having appropriate infrastructure (Bhandari et al., 2021) and higher levels of digital skills through increased usage (Youssef, et al., 2022). However, the findings of this study reveal that despite the presence of adequate infrastructure in place, increased usage does not seem to be taking place due to a deficiency in students' basic literacy skills relating to reading and writing, which are foundational to navigating and using technology effectively (section 5.8). The implications of these findings indicate without a solid grasp of these core skills, teachers abandon or limit the use of digital tools as they focus on the achievement of the object of the activity system. These findings add to the existing literature relating to digital skills and academic ability since what seems to be missing is how foundational literacy, to start with, seems to be a factor for students to be able to develop their digital skills. Further research should be carried out to examine the correlation between foundational literacy relating to reading and writing to identify its significance on digital skills.

6.5 Summary of discussion

The findings provide some insightful factors relating to the challenges teachers face when trying to develop boys' digital skills which have been identified by the contradictions being faced by them. These contradictions are manifesting in various forms for teachers, at times they can be seen as disturbances, conflicts, dilemmas or double-binds (Cong-Lem, 2022). Delving deeper into these manifestations would be necessary to fully uncover the underlying systemic tensions that are occurring and would require further investigation to ensure that the challenges they are facing are not simply individual frustrations being experienced but are true to systemic tensions in a collective activity system. Furthermore, the teachers involved in this study consisted of teachers from different specialisms with differing subject outcomes, so whilst the activity system is collective in achieving the overall object and outcomes, these may be achieved in very different ways which would require researchers to consider subject specific contradictions.

Moreover, these findings not only demonstrate factors which may inhibit students' development of basic digital skills, but from an Activity Theory stance highlights sources of change that could occur within this context. However, for more effective analysis it would be necessary to further incorporate students' perspectives, including their agency and potential resistance in this context. This would be important for effective change to transpire since students have their own motivations and challenges, and whilst changes may be made in relation to the teachers experiences these changes may not be effective if the receiver of these practices (in other words students) still face or creates further contradictions within their own activity system.

Furthermore, what seems to be evident from the research relates to challenges teachers face due to emotional factors, for example feelings of frustration and anxiety. These psychological factors are not only impacting teachers but also could be factors that impact on students' motivations or anxieties to engage with technology. So in agreement with Cong-Lem (2022) whilst it is important to clearly distinguish between Engeström's and Leontiev's versions of CHAT, integrating them could prove to be beneficial when considering Leontiev's deeper focus on psychological processes. These psychological processes could act as very real sources of contradictions for teachers and students and could help to provide a more holistic understanding of this phenomena if effective change were to occur.

7. Conclusion

This paper was motivated by the desire to explore why teachers were not developing students' digital skills in an institution that is well-resourced with digitally skilled practitioners, the motive for which arose from previous research conducted by the author. The findings of this paper have helped shed some light on the challenges these teachers face by posing the research question: how do systemic contradictions create challenges for teachers in developing students' digital skills in a boys' secondary school? The findings in this paper indicate that digital skills development is not occurring within this context because teachers are either abandoning or limiting the use of technology in their classrooms. This is occurring due to the contradictions that are occurring within their activity system. One of the key aspects related to students and their existing digital skills level at secondary school level, their attitudes and behaviours and their basic literacy skills, while conflicting organisational policies added a second dimension to the challenges being faced.

What was important in these findings is understanding that whilst students' use of technology might help with academic performance, students need basic literacy skills to navigate technology. Furthermore, in a culture where grades and passing are seen as important, digital skills also require some level of recognition in non-technology-based lessons. The implications of such findings suggest that if digital skills are to be developed in this context, then the government would need to consider how to improve basic literacy skills and how digital skills could be incorporated into a curriculum that awards students for development in subjects that are non-technology-based like Math, Science and English. Furthermore, the fragmented approach taken when setting policy within the schools does not work; a holistic approach must be adopted to avoid conflict with one policy against another, which, when not tackled, leads to additional challenges for teachers.

The broader implications of this study posit that the challenges identified in developing students' digital skills may not be isolated incidents but indicative of systemic tensions within educational practices across contexts. Further research with a wider sample and across other contexts could help to improve understanding of the challenges teachers face when developing students' digital skills.

As such, the findings from this study contribute to the growing body of literature that may have been overlooked in the field of digital skills development. They also help inform policy and practice, leading to more effective teaching methods and better-prepared students for the 21st century.

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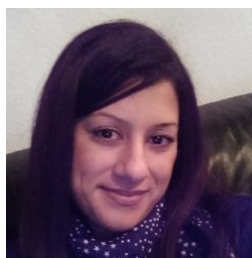
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