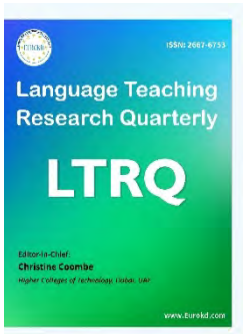

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Integrating Critical Thinking into Digital Connectivism Theory: Omani Pre-service Teacher Development

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Abstract

The current study implements digital connectivism theory within an English language teaching (ELT) program—specifically for pre-service teachers—in order to evaluate teachers' ability to generate teaching activities with Bloom's taxonomy. Connectivism theory emphasizes the principle of connecting students in a network of cognitive processes which in turn can allow the transfer of information; yet it is unclear what students do if they were asked to evaluate, synthesize and analyse (the three higher order skills of Bloom's taxonomy) in connectivism learning approach. The methodology of the study is a case study conducted by means of clustered sampling on 54 teachers, who collaborated in 18 groups and were distributed between ten schools in one district of Oman. The participants were involved in critical thinking training, generating reflections, group discussions, and filling in a checklist. The results indicate a strong need for conceptualizing the principles of connectivism theory to provide a guideline for teachers and students. It is then concluded that the concept of mental "knowledge" is expanded when integrating connectivism and Bloom's taxonomy in the ELT field. The study proposes pedagogical implications for ELT programs.

Keywords: *Digital Connectivism, Bloom's Taxonomy, Technology Affordances, Knowledge Sharing, E-Collaboration Affordance*

Introduction

Language teacher education is one of the most important programs for elevating nations and developing students from earlier ages. In Oman, domestic teacher training programmes have continued to expand since the mid-1980s (Chapman et al., 2012). The landscape of teacher preparation programs continued to experience growth from the mid-1990s up to the present;

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however, teacher mobility has been tightened by increased competition and increasingly limited job availability (Chapman et al., 2012). At the same time, the number of Omanis delivering education increased from 8% in 1980 to 89% by 2008 (World Bank, 2012). While in the workforce, the Ministry of Education (MoE) confirms that new in-service teachers undergo a two-week taught course (World Bank, 2012). However, it is unclear exactly how pre-service teachers bridge their theoretical knowledge into practice during their training programmes.

Recent transformations in teacher preparation programs are being witnessed, nevertheless, to cope with Oman's 2040 vision to incorporate changes such as entrepreneurship and critical thinking courses, outcomes for which have not yet been attested or confirmed. By and large, these new transformative courses are deemed part of the 21st century requirements (see, Lai, 2011; Kropf, 2013; Collins, 2014). However, how to integrate theoretical perspectives in the new digital era—particularly Connectivism learning theory—remains widely debated, showing that context-driven decision making is important (Voskoglou, 2022). On this basis, the study presents a conceptual framework for Connectivism in Oman through the lenses of critical thinking theory.

Literature Review

Critical Thinking Theory

Given the existing need for preparing 21st century teachers, critical thinking skills is one of the important components of teacher education that is being overlooked. However, it has never been more important given the challenges presented by the recent health–education pandemic era. Within the realm of the workforce, it has been identified as a central skill in the 21st century (Godett, 2022; Lai, 2011). However, rarely do we find pedagogical or collegiate spaces where teachers are able to discuss and enhance their critical thinking (CT) skills. In Yuan et al.'s (2022) systematic review, 25 empirical studies were reviewed for the period 2010-2020 to identify the gaps in integrating CT in language teacher education. Strikingly, teachers were found to possess unclear conceptualizations of CT, before even taking into account their ability to apply CT in praxis.

Less has been confirmed with regards to pre-services teachers' CT dispositions and skills. Fikriyati et al. (2022) investigated five elements of CT skills: ability to interpret, ability to analyse, ability to evaluate, ability to make inferences, and ability to explain. Following the study, it was found that pre-service programs need to firmly anchor theory-praxis of CT into preparing adequate teachers. It is not surprising at all to find out different countries around the world embracing CT. For instance, in Thailand, the 4.0 vision urged new directions towards developing CT skills. However, very low uptake of logical thinking and analytical thinking of 2.09% was reported to have been achieved (Changwong et al., 2018). Only after the stark findings were revealed were experts called upon to develop a new model. This directs us to reflect on the case of Oman, whose 2040 vision was launched in 2020. Notwithstanding, the outcomes of relevant skills needed for this vision have not been measured. This suggests further investigation is needed to bridge the gap between rhetoric and delivery of the vision in practice. Regardless, Oman vision 2040 is highly ambitious with regards to achieving a competitive economic hub underpinned by elevating educational outcomes with clear indicators (Oman Government, n.d.). Two of the ten vision indicators outlined in the document are Global Competitiveness Index of the top 20 countries and Skill, Global Competitiveness Index of the top 10 countries (p. 10). In order to achieve these ambitious aims, it will be important to develop new models and practices taking into account relevant literature and lessons learnt around the world.

When incorporating CT into ELT programmes, there is significant potential for both cognitive and linguistic gains. Wilson (2016) applied CT to include reading critically within an English for

Academic Purposes (EAP) course, finding that teachers used different techniques to draw students' focus to critical pedagogy. The positive influence of 'delicate scaffolding' on enabling students' disposition towards deep meaning making of texts was noted.

Parameters of critical thinking have dramatically expanded from Bloom's taxonomy in 1984 that include both lower order skills, i.e., the basic cognitive learning ability demonstrated in any domain, and higher order skills, i.e., transformation of the lower order cognitive skills. Brookhart (2010) sets three domains that fall under higher-order thinking: transferring of knowledge, problem solving, and criticality reflecting on issues. The array of cognitive skills are set in a pyramid structure whereby the lower order skills and basic skills are positioned at the bottom of a pyramid moving from remembering, to understanding, applying, then analyzing, evaluating and creating. Applying this to an EAP context, Wilson (2016) identifies different higher order skills such as recognition of underlying assumptions, identifying prepossession, analytical differences and similarities. Bakhtiyarovna (2022) likewise demonstrates that there are wide range of practical strategies, relevant both digitally and non-digitally, to implement Bloom's taxonomy creatively in practice.

However, the extent to which ESL learners could perform those cognitive operations further can be questioned due to language barriers that hinder understanding of symbolic, rhetorical or cultural implications. Rarely are cultural dispositions taught as an integrative part of the language, even though languages and sub-languages (or accents) are unique by their own cultural impressions. Indeed, Grosser and Nel (2013) correlated between students' linguistic ability and executing CT skills, conducting their study at a South African university. This CT parameter was expanded by adding the behavioural and habitual tendency of CT called CT disposition, which is advanced by Facione (1990) who made the distinction between possessing CT skills from CT dispositions (Sk & Halder, 2020). Furthermore, Meneses (2021) adds to CT disposition the ability of students to analyse content through recognition of author standpoint and argument. Indeed, the list can be expanded when teaching different skills and focusing on its education goals.

Despite the importance of CT dispositions and skills, countries such as Oman cannot always rely on published materials to promote these higher-order thinking skills. Ulum (2022) found that a prominent EFL reading resource failed to develop hardly any cognitive skills linked to Bloom's taxonomy other than the lower order thinking skills. Clearly students and their teachers deserve better and have the potential to achieve so much more.

Bridging CT into class praxis, Collins (2014) presents four phases for teachers of English language. First is teaching alongside CT concepts which involves awareness of the different CT sub skills being involved consciously and unconsciously. Teachers should aim to engage in problem solving, analysis, inferences, and so on. The second stage is planning activities directed to particular higher-order skills. Collins (2014) argues that the actives have to be well prepared before the class and not spontaneous to allow teachers time to set questions focusing on particular higher-order thinking skills. Moreover, this stage should involve students reflecting on their own learning. The third stage involves directly teaching subjects with their underlined CT operations that can scaffold learning the particular subject or field, be it math, chemistry, or biology. Hence, the fourth stage involves providing enough support so that students take up the CT skills. The fifth stage is consciously teaching and assessing the critical skills as being exposed to the steps of analysis, evaluation, making judgment, or comparing and contrast which can encourage students to learn creatively and intelligently. Following Collins (2014), the design of the current study included exposure to CT operations and skills during the first stage whereby students were involved in various activities.

The concept of CT being highlighted, it is appropriate to link this to one of the organizational theories within the digital platforms: connectivism learning theory. One important tenet of connectivism is linking the individual to different resources and hence requires the learners or users to critically evaluate digital content (Siemens, 2008). Therefore, both theories of CT and Connectivism are aligned together to create a teaching framework suitable for preparing the 21st pre-service teachers of English language.

Connectivism Learning Theory

Acknowledging the involvement in the e-ecosystem that we have experienced in the last three decades, the learning process has been influenced by social constructs; hence, it has transformed from purely cognitive towards a multifaceted approach. With a provocative discussion on the yet unexplored opportunities in connectivist learning theories, bridging the contribution of connectivism to the learning process has to be relied on in the digital era. Siemens (2005) rightly emphasised that in order for commonly used educational theories to remain relevant, they need to take stock of technological advancements, affordances and knowledge. While acknowledging the merits of different learning theories such as cognitivism, behaviourism, or construction theories, it is high time that knowledge order, connections and organization were also prioritized in mediating learning. Learners must be active agents engaging with a digital information system and utilizing this to co-construct a knowledge base for themselves and their community.

Recent trends of self-directed learning have been significant in connectivism. Siemens (2005) outlined possible routes and characters through which learning occurs. He noted the multimodality of learning and the fact that learning resides outside formal education and is, rather, shaped by experiences. He goes on to stress the importance of longitudinal learning and that technology is a tool that formulates and mediates many learning experiences. With much focus on organization of knowledge (Siemens, 2005), learners are to collaborate to develop and attain new skills. With this theory in mind, learning is not rigidly predetermined or stereotyped as in schooling; various aspects of learning should be left open rather than routed in particular ways.

Consequently, enabling learners to take the lead is particularly a theme relevant to the 21st century (Lenhart, 2022). Moreover, the learners' role is to extend particular mental, behavioural or tool-based interconnections which presuppose an extension of understanding or remembering. The connections serve as provision of information that is being described as "direct access to reliable information from millions of sources to duplicate, reproduce, and share within their social networks, and to delete, critique, and discard inaccurate, irrelevant, and unreliable information" (Kropf, 2013, p.13). However, within these connections, CT dispositions have to be central considerations when enabling students to skilfully evaluate the online resources. This connectivist approach, indeed, is suitable for adult learners (Al-Maawali, 2022) given their maturity and self-awareness when looking after their own created connections.

Common to both Connectivism and Community of Practice (CoP) (Wenger, 1998) is the concept of shareability. CoP, however, emphasizes the social perspective whereby "meaningful learning in social contexts requires both participation and reification to be in interplay" (Wenger, 2010, p. 180). Although the learning process is anchored between humans as a social beings and their social relations, by the same token, Edwards (2005) warns against disregarding the cognitive role underpinning human learning. Indeed, the social context by itself does not explain context; it is certainly important to consider active involvement of criticality and mental approaches as part of learning new abilities. Hence there should be a departure from thinking of connections as merely social contexts but rather as tools for critically co-constructing knowledge.

This being said, issues emerging from digitally connecting students in the information society cannot remain unobserved with the particular need for directing learners towards effective and

critical use of the plethora of information sources (Safarati & Lubis, 2022). A quick search on a particular subject can fire up millions of multimodal resources created by different users from different locations (Kropf, 2013) with potential for creative learning, but also confusion. To address potential difficulties in managing learning in the information age, it is necessary to scaffold from early schooling so that the necessary skills, dispositions and grounding are gained.

Teachers' digitally oriented teaching is important to establish digitally based learning environments as a predetermined factor for students' inclusion of technology for learning (Lai et al, 2017; Al-Maawali, 2020). For instance, a Hong Kong-based university study conducted by Chan et al. (2017) elicited qualitative data on seventeen students' uptake of interactive digital tools. Perceived affordances of technology use by students were significantly linked to how the teacher trained students on using the tool. Usability of the tool, motivation and peers were also considered key factors in successful uptake. Clearly, teacher choice of materials and their ability foster motivation and a community of peer support can dramatically improve uptake. Nevertheless, how well prepared many teachers actually are to support students in a constantly evolving technology and artificial intelligence-based language learning landscape is questionable. In Abalkheel's (2022) qualitative meta-analysis 175 recent papers, a recurrent theme was the inadequate training and insufficient competence of many EFL teachers in this area. In response, Abalkheel advocates training which will ensure better upskilling with technology whilst at the same time framing this in the context of Bloom's taxonomy, thereby maximising cognitive outcomes. Advocates of technology provide data on the benefits of new approaches—computer, mobile, robot, virtual worlds (Bahari, 2022)—, but it is important not to lose sight of the pedagogical ideas which must underpin the use of tools.

Whilst advocating use of Bloom's taxonomy and new technology, it is important to frame these within a connectivist ecosystem. Herrington et al. (2009) advance principles for teachers to construct a digital knowledge base platform. First, the digital platform has to be linked to the users' real world rather than intrusive and one-time use. Second, learning has to be mobile towards users' zones of comfort to assimilate in their daily lives. Third, knowledge of the technologies and familiarity constructing by allowing exploration opportunities if the adopted technologies are new. Fourth, blended learning technologies are incorporated. Fifth, integration of technologies has to innovate in the manner by which learners use and interact with relevant tools. Sixth, the manner by which learners are linked allows for both individual and collaborative efforts. Seventh, contemporaneous use of technologies is advised whenever needs arise. Eighth, formulation of a clear understanding of the technological affordances is provided. Ninth, knowledge transformation outcomes are achieved. It appears that such principles will remain relevant despite an ever-changing technological landscape.

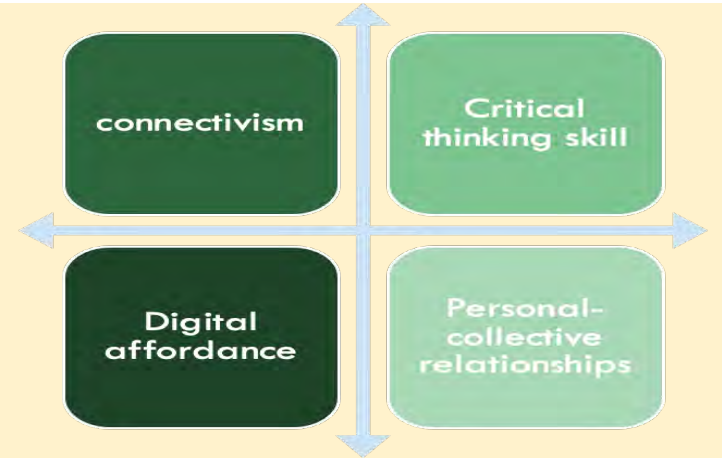
While in-service teachers often require opportunities for upskilling, the advantage for pre-service teachers is that they are likely to have more time and spaces to experiment and creatively develop practices. When considering pre-service teachers, it is essential to consider their new teacher identity which is taking shape—this can be a powerful intervention to enhance their future professionalism. Connectivism can also play a vital role in developing this identity through the channels it offers to work collegiately, developing CT skills focused on teaching. Gurjar (2019) showed how 75 students on a US teacher education course shared activities, artifacts and blogs on Twitter. Findings based on a survey administered to the pre-service teachers and their analysis of their online activities suggested that critical thinking on teaching extended beyond the traditional walls of the university and school classrooms. It was also seen how collegiality and support offered by peers in this medium contributed to the construction of professional identity. In addition, Thota (2015) notes the benefits of connectivist learning on an M Ed. TESOL programme with Asian

learners. Moodle and Blogs were used to create and share digital materials with peer- and self-reflection and feedback incorporated. Successful outcomes of these activities point to engagement in analysis, evaluation and co-creation of knowledge; while building professional knowledge, professional identity develops. Finally, Yelubay et al. (2022) elicited pre- and post-experiment quantitative questionnaire data from 147 MOOC-based pre-service teachers in Kazakhstan and categorised benefits in terms of motivational, technological, cognitive, and ethical gains. These interventions and their outcomes are promising in terms of the potential outcomes for Omani pre-service teachers, their connectivist learning and inchoate professional identity.

In synthesis, Figure 1 summarizes the key areas discussed in this literature review which can be relevant to the present study.

Figure 1

Interrelated Concepts for Connectivist Critical Thinking Learning Approach



Method

In order to address the research gap, this paper utilizes a qualitative case study approach. According to Yin (2017, p. 15) a case study can be particularly illuminative when "boundaries between context and the phenomenon may be unclear". When critically examining and understanding the process of connecting with other members of the teaching community leveraged through G-suite and WhatsApp, this approach is relevant. Connections created here are not through Internet resources but between different members to creatively engage with critical thinking processes, as described below. Hence, activity on the Internet played a role in mediating critical thinking processes between individuals and their mentor as well as eliciting data for the purposes of this research. The different tools for collecting data are texts produced on online platforms through the trainer's reflections, pre-service teachers' reflections, see Figure 2 below.

Participants

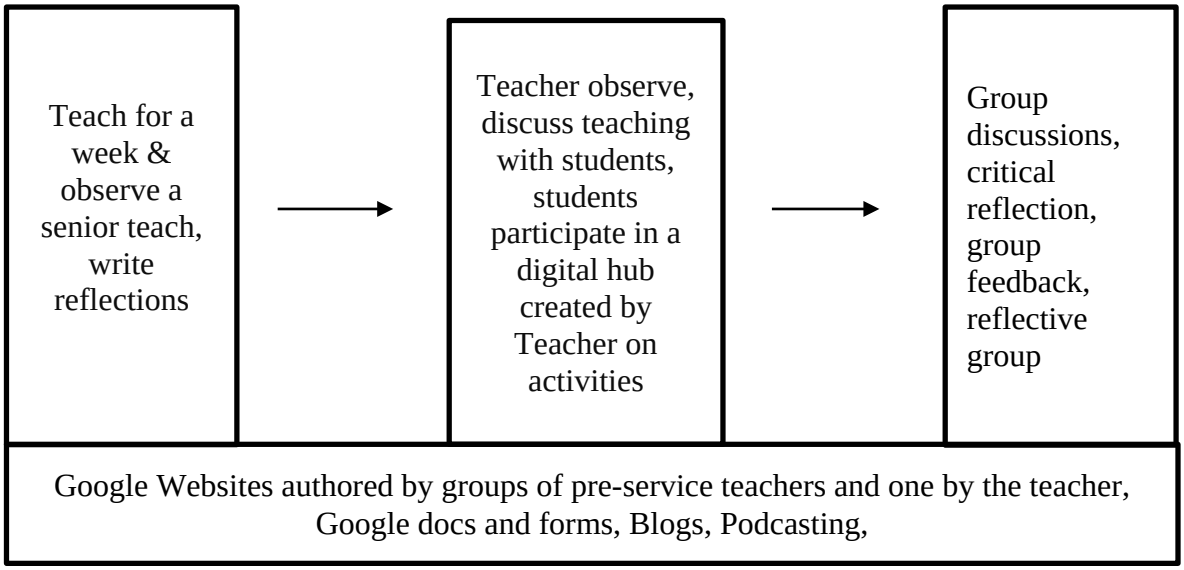
54 pre-service teachers collaborated in 18 groups distributed at ten schools in one district of Oman. Each school had three to seven teachers who were selected by means of purposive sampling. All participants (25 male, 29 female) are in their fourth and final year of study—specialized as teachers of English language with a bachelor's degree.

Connectivist Critical Thinking Process

Students are allowed to extend their own resources and uses of different platforms for which they have familiarity; however, most collaboration was clustered on using G-Forms and Websites. The mechanism followed three main stages: training, connection creation, and reflection, see Figure 2.

Figure 2

Process of Connective Critical Thinking Data Collection



The activities through which these processes operate can be seen in Figure 3.

Figure 3

Example of Digital Connections Demonstrated in G-Website

Procedure

Pre-service teachers were taught at the college for six weeks following the discussed model without teaching at schools. The discussion and mentor support included delivery of theoretical basis, different roles of teachers, pre-required skills, and training on critical skills subsets. A platform was created for them to digitally interact, collaboratively create and analyse. This was conducted regularly for about three hours per week. Following this, pre-service teachers were involved in teaching English subjects at Cycle One—Grades One to Four—and Cycle Two—Grades Five to Ten—at different schools in Oman in one district. During the application stage, pre-service teachers were advised to connect critically with each other, as outlined above, on the generation of activities and reflect about teacher actions and behaviours. This was followed up with 18 group discussions (for each sub-group) and a checklist filled out individually. Field notes were also taken by the researcher throughout the process to document any contextual details relevant to participants and triangulate data (Phillipi & Lauderdale, 2017).

Context of Pre-Service Teaching

Students who are majoring as teachers of English language undergo a preparation program of about four years. The preparation program includes courses related to knowledge of the specialism such as linguistics, literature, grammar, curriculum, and assessment. All of these fields include sub-fields. In terms of the teaching profession, the 'teachers-to-be' are expected to acquire knowledge and to be able to transform that knowledge into practice via critical analysis of MoE school books, micro-teaching sessions at college where their peers act as pupils, and applications in reality at schools. Supervisors or mentors consider the behaviours, actions and mental planning of the teachers-to-be prior to attending a teaching session. Observation of experienced senior teachers and on-going reflections after each teaching session and for the forthcoming teaching session are also integral elements. This training is called practicum three and four and repeated twice for each trainee (pre-service) in their third and fourth years of specialization. The present study is conducted during the trainees' fourth and final year of study.

Ethical Considerations

An ethical approval at the college was obtained on 5th of January 2022. The following step commenced at the start of the second academic semester Spring 2022 from February to April during which pre-service teachers were informed of the purpose of the study, its significance, nature of their participation, and the research use of the papers. Their participation in the study would not impact their progress in the course and their anonymity will be kept. In accordance with this procedure, participants were requested to sign a consent form.

Results

Thematic analysis yielded two major themes: feeling of belonging to a wider community or collective identity of pre-service teachers, and knowledge of co-construction and reorganization (creativity, space, time for building up and collective reflections) as can be seen in Table 1. Themes relating to concerns and challenges in practices that are repeatedly voiced were included under a sense of belonging to the wider community as these were often dealt with within the teaching practice community.

Table 1
Main and Sub Themes of Pre-Service Teacher Collective Identity

Main Themes	Sub Themes
feeling of belonging to a wider community: collective identity	• School environment: not belonging, covering duties, having unclear duties, knowledge creator anti-book, new identity, evaluator and mediator of knowledge, owner of new ideas. • among pre-service teachers: group sharing and work: transition, discomfort of transition of type of activity, high achievers take charge of assignments, selective connecting with physically close, empathetic or sheer leading comments
knowledge of co-construction and reorganization	Knowledge is not sharable, not connective, and anti- getting marks Knowledge is easily accessible and scaffolded by peers

The sense of collective identity is one salient theme that is exhibited at two levels: the school environment and among pre-service teachers. At the first level, the transition from student as book worm to a teacher as a builder (constructor, evaluator and owner) of knowledge was one of the most noted codes. One pre-service teacher affirms:

"Now it is important how I stand or talk or say things to my pupils…at college it is important my language—I write correct grammar and I memorize the materials and study them well. This teaching experience is different and new for me." (NM)

Participants also voiced their concerns as not being treated as teachers or used negatively to cover for schoolteachers' duties such as their classes or monitoring students during breaks or extra teaching. One preservice teacher indicates:

"It is unfair that we do their work [schoolteachers duties], are we allowed to say no? [asking the researcher for confirmation]. We have other responsibilities for the college and we need our free time to study our college courses." (BA)

Moreover, about 35% of pre-service teachers felt a sense of not belonging that was largely attributed to the basic schoolteachers due to assigning them arbitrary teaching loads or parts of teaching lessons. Pre-service teachers are meant to be assigned two full days of teaching to balance their ongoing studies and need for teaching practice. Almost 90% of the pre-service teachers were isolated in offices other than the teachers' offices such as cultural room, printing room, or common rooms which inhibited a sense of attachment to the larger community of schoolteachers [from researcher's observation].

At the second level (among pre-service teachers), connections and interrelations between individuals are dependent on their social and interpersonal skills and their ability to maintain good working relationships. All the preservice teachers indicated that they are not used to conducting assignments holistically in groups, but only 9% were unhappy about this. The academic life at the college is advantageous to individual efforts to succeed, one preservice teacher voices:

"We are assigned tasks, quizzes and midterm exams that we do alone. There are some assignments to do with a friend or a group but courses assessments are designed around individual performance. I rarely depend on my friends in group assignments. It is like I try to make sure that it is answered correctly by myself." (WM)

This is voiced by high achievers who try to control group work. Giving these tasks allows little time for students to engage in CT skill development with other members. As a result, the high achievers are automatically the best in CT tasks. Indeed, there are three high performing pre-service teachers who felt challenged by the transformation of activities towards connected CT skill. Moreover, all teachers were selective in terms "who" to *connect* with. Their choice is made over "who makes us better" (SM), "who is a hardworking" (KH), and "physically close to them" (EM and SM) in terms of location of living. For instance, a group of female pre-service teachers were comfortably connected in creating activities due to mobility and having a private car. On this, rarely female pre-service teachers already own their cars; they commute by college or externally hired buses in groups. Male pre-service teachers tended to commute either by taxis or cars that are private or shared.

Upon analysis of preservice teachers' reflection on their peer's classes, data indicate that the pre-service teachers were better at critically reflecting on their realities than transforming knowledge into praxis. Observational logs of pre-service teachers on each other typically offer commendations such as "teachers have good management of class," "teacher explained well," or "the teacher had achieved the learning objectives." Their feedback was softly supportive to their peers rather than deploying critical reflection skills, often in contradiction with the school supervisor's comments.

There were about five negative comments but were coated with soft words such as "the teacher is *trying* to help her students; *but their level is low*," "this class all teachers know is noisy," "I think she is trying to distribute attention to all students." In the discussion with the teacher, the pre-service teachers noted that their comments are not absolute but only ideas for suggestions and they are not the supervisor. They tried to remove the coat of a supervisor and indicated that providing critical comments is not their role. But underlying this behaviour is that the pre-service teachers were gently brushing their relationships and maintaining positive social connections.

Availability of knowledge from colleagues led to creating a hub for creative ideas and the least creative individual felt inclusiveness and not left alone as usually is the case. About six male pre-service teachers declared they usually request more support of ideas and clarification from teachers; however, this was not needed considering the support they could get from peers. This sub code is particularly critical as students have been engaged in CT skill in terms of transforming, analysing, criticizing, so the number of pre-service teachers who would request support might be higher. The majority (41 out of 54) of preservice teachers voiced a sense of ease and having a bank of ideas. This can be called mental scaffolding for each other. As a result of such, 'relief' and 'comfort' was reported due to "taking off pressure of not knowing if they are on the right track" (the majority noted this). Indeed, that was linked by fifteen students offering positive commentary such as, "I love this course,'' "I felt it touching my comfort zone," "I spent a lot of time working in developing and creating materials," and "it was easy to find out new ideas for my students."

It is surprising to find out that *not all knowledge is shareable and connective from one to another*. Easily constructed knowledge, process of learning, or resources is shared in all connective groups. Almost ten pre-service teachers failed to share their creative ideas of activities on restructuring class rhythm that were only discussed with the supervisor. Those pre-service teachers tended to secure their own created ideas but were willing to support their colleagues when needed

with trying out ideas (not necessarily as good as their own). The supervisor noticed that the creative pre-service teachers were the most dominant of the connections in the learning community.

Collaborative relationships were sometimes negatively perceived and in conflict with the need to attract high marks and academically compete. Almost half of the preservice teachers (25 out of 54) felt in disagreement with the basic tenets of working together in terms of reflection and constructing new activities. Some of the comments in the discussions are: "I wanted to help my friend but I spent time preparing my class assignments," "I think it was useful but I have to spend time on my ideas," or "I want to learn from … [names deleted] but I do not want to get same mark." They preferred individual construction, meaning that trying to compete and achieve higher marks remained a recurrent theme.

Discussion

Though it is beyond the focus of the current paper to deeply discuss identity formation and construction, this theme was salient in the results, particularly the cultural and social constructs of a collective identity. On the assumption that collective identity is formulated and structured by the senior members in the community, pre-service teachers felt the pressure of keeping up within the community of teaching at their assigned schools and often voiced being treated not as teachers. Oren and Bar-Tal (2014) narrate views of collective identity as a combination of the individual and the social characters of identity, which in return structure and organize members in particular manners. Hence, individual mental 'identification' of their belonging into a particular set of group or 'collective identity,' emotive relation, and personal predisposition (such as eagerness to be part of the collective identity. Hammack (2008) extends that commonality between individuals as salient while variability between individuals is rather dis-emphasized. To this end, no study has identified the academic collective identities generally or particularly in communities of pre-service teachers. The literature overall shows that there is more scope for collegiality among pre-service teachers and a change in practices to increase competence, shape participants' identity, build on critical thinking and extend community participation (Abalkheel, 2022; Gurjar, 2019; Lenhart, 2022; Thota, 2015; Yelubay et al., 2022). Clearly, existing evidence of good practice should be critically reviewed and examined in terms of their potential applicability to shaping future Omani teachers.

Connective CT activities afforded pre-service teachers mentally and socially challenging connections. Digital integration into community platforms should add a sense of utility for the user himself (Herrington et al., 2009; Al-Maawali, 2020, 2022) and should not be pre-designed without attesting the affordances that students comprehend of such tools. Furthermore, with regards to designing platforms it is essential to appraise the social parameters of learning since the learning theories are not neatly intertwined with the era of technology to provide clear mechanisms of connecting the extendable and resourceful online 'knowledge' with the development of learning. Though connectivism learning theory, usefully explains what processes and how learners engage in; its tenets remain limited with regards to how connections scaffold, mediate, transform, co-construct, or create connections development.

Given that digital social learning and sharing ideas among pre-service teachers, it is likely that this policy along with others associated with the Omani 2040 vision can disrupt existing professional and cultural norms. Nevertheless, the positive potential of such policies for teachers shown by Lenhart (2022)—such as communication, leadership, critical thinking, and problem-solving skills—mean that it is important to persist and overcome challenges. Indeed, if teachers are able to model these behaviours among themselves, they will be better equipped to develop collaborative digital skills. Mosquera Camargo (2022) showed that in Ecuador A2-level EFL

language students were effectively able to engage with higher-order thinking skills and a range of digital tools such as Vocaroo, Padlet, FlipGrid within a connectivist theoretical. It seems logical that to see long-term gains in this area, it must begin with teacher education. Given the repositioning of learners and teachers in this rapidly evolving environment (Gerhardtl et al., 2022), Godet's (2022, p. 28) point is all the more relevant: "we must be resilient and embrace the challenge of thinking and doing differently. The world for which we have traditionally prepared our children no longer exists."

Connective teachers-to-be appreciated CT scaffolding. Presently, in line with Bahari and Gholami (2022) it is important to join the call for more robust conceptualisation of connectivism theory principles to provide better guidelines for teachers and students on the process of learning. As such the socio-cultural construct of scaffolding should be looked at from the Connectivism perspective as mediated by and through different online experiences when *connecting* with other learners, thinkers, experienced people. Moreover, this learning process occurs only when a learner takes the lead to negotiate a particular thinking mind set rather than copying materials. It is high time that we reconstruct the way our learners look at problems and negotiate solutions, as solutions in the mind not copied from others. Maybe then, learners will appreciate their own creative ideas and banish unethical academic issues such as ghost writing or plagiarism (see Agha et al., 2022).

Nonetheless, the result reveals conceptualizing of knowledge as not completely transmissive but dynamic. Hence, the concept of mental "knowledge" has to be re-envisaged when integrating connectivism and Bloom's taxonomy in the ELT field. In this regard, it is not astonishing that specific principles and approaches be developed considering the promising prospects of the taxonomy for organizing learning as a dynamic and individualistic and group process. Needless to say, Bell (2010) accused Connectivism of failing to provide a complete framework regarding learning. Here is not to agree with Bell totally, but also to highlight the imperative need to guide teachers on their instructional teaching. Regardless, the digital ecosystem is vastly different from teacher-student confined to a desk where learning can be seen as behaviourist or cognitive and students have to fill in the gap inactively by following teachers' instructions. However, the findings of this study chime with the work of Lunevich (2022), —more important than the actual tools, a focus on the pedagogy and theoretical underpinning of digital tools use will be what most enriches participants' learning experience.

Pedagogical Recommendations

Consequently, academic collectivity is nurtured but is still a new connective concept whereby students learn to generate, reflect, critically develop new artifacts based on their understanding. Having this mind set is clearly beneficial for nurturing learning in any 21st ELT program. This is to say activities and learning actions in any program should entail cognitive and active involvement in the seeking of knowledge, rather than prioritizing teaching techniques.

Hence, based on the findings, the study recommends incorporating several key features. Fostering participants' motivation (Chan et al., 2017) and ability to work cooperatively and collaboratively to achieve an effective learning community (Lenhart, 2022) are crucial. Undoubtedly, critical engagement with materials that is shared and exercised utilizing different concepts of higher order thinking skills and dispositions must also be incorporated (Abalkheel, 2022). Though the teacher plays a major role in identifying what and how digital tools interplay and scaffold learning; students' ability to autonomously use and organise the available affordances in favour to support colleagues and students as well as themselves will be what constitutes evidence of success. Practically, it is important that teacher education in Oman and beyond seriously works towards implementation of a model which integrates Bloom's taxonomy, critical

thinking and connectivism in digital technologies with pre-service teachers learning to work more collegiately and achieve better outcomes for themselves and their communities.

Conclusions

This study intended to understand the level of reflections and critical thinking involvement of pre-service teachers of English language, incorporating connectivist learning theory. The significance of the study is that both CT and connectivism are compatible, can be integrated and show promising results for pre-service teacher learning. The problem has been investigated by deploying a qualitative case study based on triangulating data from observation, pre-service teachers' reflections, accumulated activities in digital platforms, and supervisor's feedback. The results highlight that knowledge is power-specific (not always shareable) as it is personally structured. However, good practice on collegiality and supportive professional communities can point to interventions which may support further development in the personal and collective relationship dimension of the proposed learning approach. The study also highlights the need for nurturing academic collective identity beyond the limitations of class and marks. Fostering critical thinking, making use of Bloom's taxonomy, in pre-service teachers' and their activities is crucial so that the next generation of learners receive an education fit for the 21st century. It has thus been argued that connectivism can be a highly effective way to develop this, addressing issues of professional identity as well as CT learning. The findings of this small-scale study can be consolidated through further research which provides evidence on interventions in connectivist teacher education environments that can maximise digital affordances. As a priority, these interventions should aim to deliver the best outcomes in terms of critical thinking skills and collegiality among pre-service teachers.

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