



Using Activity Theory as a Base for Investigating Language Teacher Education through Digital Technology

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Abstract. In this article, the authors explore the features of the Makerere University Electronic Learning Environment (MUELE) platform and how it is used by language teacher educators to facilitate pre-service teachers' development of Pedagogical Content Knowledge, Content Knowledge and Digital Competences. The article is drawn out of data collected using platform user and activity analysis tools to yield data on the platform features, their usage and activity types. The Activity Theory principle of contradictions is used to provide an interpretive framework to explain how the platform has created tensions, contradictions and transformations. Findings indicate that the platform has features that can lever transformation of teaching and learning practices that facilitate the development of pre-service teachers' competences. However, use of the platform is constrained by tensions and contradictions at system and individual levels.

Keywords: Learning management platforms; language education; activity theory

1 Introduction

Pedagogical Content Knowledge-(PCK), Content Knowledge-(CK), and Digital Competences-(DC) are key competences of the teacher preparation programme (Kleickmann et al, 2013; UNESCO, 2011). Given the importance of these competences for teachers of the 21st century, providers of quality teacher preparation programmes are urged to provide effective learning environments and opportunities to facilitate the development of these competences by pre-service teachers (Darling-Hammond, 2006). Moreover, the notion of a learning environment extends beyond physical infrastructure, to include technologies that support learning in class and virtually (AACTA, 2010).

Despite the importance attributed to teachers' development of PCK and CK, understanding of how learning opportunities and technologies available during teacher preparation are actually used and implemented is limited (Kleickmann et al, 2013; Cochrane-Smith and Zeichner, 2005). Moreover, there have been limited studies that apply the principle of contradictions and educational technology use contexts in African universities, such studies have included (Barab et al., 2002; Dippe, 2006; Hardman, 2005, Peruski, 2003, Rusell and Schneiderheinze, 2005). This paper contributes to this body of knowledge by highlighting the contradictions, tensions, transformations that are brought about by the use of MUELE-platform for supporting pre-service language education teachers' development of PCK, CK and DC at Makerere University.

In this paper the activity theory-(AT) principle of contradictions is used as a lens to analyse how teacher educators use the MUELE-platform to facilitate the development of pre-service language teachers' PCK, CK and DC.

Content knowledge-CK, represents teachers' understanding of the subject matter taught. According to Shulman (1986, p. 9) "the teacher needs not only to understand that something is so, the teacher must further understand why something is so". Thus the emphasis is on a deep understanding of subject matter taught at school (Kleickmann et al, 2013). The knowledge-base in language education is categorized under four dimensions and include; lecture activities, the language teaching resource centre and library activities the language teaching laboratory activities, and the internship of language student teachers (Mulumba 2011). For student teachers to tap into this knowledge-base, they have to utilize a variety of opportunities provided by the institution. The traditional support structures such as the library, resource centres and book banks are the major portals outside the lecture room, that develop learners' knowledge base. However, online provisions such as the computer laboratories and other electronic learning platforms are steadily becoming essential deposits for knowledge consumption. The knowledge-base of language education includes academic and professional knowledge; which encompasses pedagogical, curriculum and content (subject matter) knowledge (Holden & Hicks 2007; Grossman and Richert 1988). Pedagogical Content Knowledge-PCK, is the knowledge needed to make subject matter accessible to the students (Shulman, 1986). Literature on PCK identified two core facets of that knowledge namely; knowledge of subject specific conceptions and misconceptions as well as knowledge of subject specific strategies and representations (Ball et al, 2008; Park and Oliver, 2008; Borko and Putnam, 2008).

While there are various definitions of digital competence, in this paper digital competency is defined using (Cartelli, 2008) definition as, being able to explore and face new technological situations in a flexible way, to analyse, select and critically evaluate data and information, to exploit technological

potentials in order to represent and solve problems and build shared and collaborative knowledge, while fostering awareness of one's own personal responsibilities and the respect of reciprocal rights/obligations.

1.1 Potential of Electronic Learning Platforms in Supporting Teaching and Learning

Electronic learning platforms are sometimes called learning management systems, these are applications used for delivery of learning content and facilitation of learning processes. These are developed for administration and teaching for tertiary education (Passey, 2011; Passey & Higgins, 2011). The platform allows administrators and lecturers to manage and use enrolment data electronically, offer electronic access to course materials and carry out assessments (OECD, 2005). The activities managed by learning platforms vary from instructor-led classroom training, educational seminars, to web-based online trainings, in addition to managing the administrative functions of online learning, some systems help to create, reuse, locate, deliver, manage, and improve learning content.

Across higher education institutions, a wide range of learning platforms exist,

“with each one offering certain features and the use of certain applications that enable the teachers and students to both handle information in the form of news and alert items, access to resources in different formats and links to pertinent materials, or websites and to communicate through discussion forums, chat rooms and linked email” (Passey, 2011, p. 2).

Learning platforms have the potential to facilitate students' engagement for independent and collaborative learning, enhance student–teacher interactions, and develop students' technological skills. Learning from technology leans more towards the didactic and behaviouristic theories whereas learning with technology has its origin from the constructivism and social constructivism paradigms. In addition, both the didactic and constructivist pedagogical approaches are applicable for online learning as they could be used to achieve different outcomes depending on the learning objectives (Passey & Higgins, 2011). Therefore, how a learning platform is used depends on the theoretical approach taken on by the educational institution and the actual users of the technology.

1.2 Rationale for Use of Activity Theory

Activity theory-(AT) investigates human activity, understood as activity in a specific social setting (Parks, 2001) such as work or learning. The main unit of

analysis in AT is the activity system defined as “object oriented, collective and culturally mediated human activity” (Engestrom & Miettinen, 1999, p. 19) which includes the interacting components of subject, object, tools (instruments or artefacts), division of labour, community, rules, and outcomes.

The subject of an activity system is the individual or group whose view point is adopted in this case the teacher educators. The object refers to the ‘raw material’ or ‘problem space’ at which the activity is directed and which is moulded or transformed into outcomes with the help of physical and symbolic “external tools” (Engestrom, 1993 p. 67). In this case the objects are the pre-service teachers. Tools mediate the object of activity, they can be external, material (e.g., a text book, a computer or a learning platform) or internal symbolic (e.g., language). Tools take part in the transformation of the object into an outcome which can be desired or unexpected. They can enable or constrain activity. In this paper, the MUELE-platform and its features are the tools which are to be used to facilitate the development of pre-service teachers’ competences. Some of the instruments and artefacts of this tool are the teaching/learning resources, course content, activity types and related information.

The mediators of the activity include the rules and conventions underpinning the university’s teaching/learning activities (e.g., academic structures, marks, standards and learning environment), the established division of labour, tools and artefacts available to the community, such as pedagogical philosophies and approaches, subject matter knowledge, and learning objects that have been developed and uploaded on the MUELE-platform (such learning objects include (language education lecture notes, exercises, reading lists, audio, video, power point presentations , and external online resources).

The division of labour involves the division of tasks and roles among members of the community, and the division of power and status in this case the community includes teacher educators, pre-service teachers and how they structure their tasks and roles on the platform. Rules are explicit and implicit norms that regulate actions and interactions within the system (Engestrom, 1993, Kuutti, 1996).

Outcomes, the outcomes of the use of the tool (MUELE–platform) are pre-service teachers’ development of PCK, CK and DC competences.

While Engestrom (2001) formulated five principles of the activity theory, for example: the unit of analysis, multi-voiceness, historicity, and expansive learning. This paper will use the principle of contradictions as the main interpretive framework to explain how MUELE- platform has created tensions, contradictions and transformations that can either constrain or lever transformation of teaching/learning practices that support the development of pre-service teacher competences in terms of developing their PCK, CK and DC.

Activity theory can facilitate understanding of how technological advances influence change (Bellamy, 1996). Moreover, Gay, Rieger and Bennington, (2001) also explain that activity theory draws attention to the dialectical process by which consciousness, learning and development, simultaneously shape and are shaped by technology. An activity theory perspective on the study of integration of technologies in education shifts from a focus on tools themselves to tools use (Benson et al, 2008). Activity theory also considers the roles of those involved in the system not just the most obvious user (Dobson, Leblanc and Burgoyne (2004), but active users who create resources for use on the technology tool.

1.3 Activity Theory Principle of Contradiction

Contradictions constitute a key principle in AT (Engestrom, 2001) and are characteristic of activity systems (Engestrom, 1987; Il'enkov, 1982). Contradictions have been described as a “misfit within elements, between them, between different activities, or between different developmental phases of a single activity” (Kuutti, 1996, p.4). They have also been characterised as conflicts or problems (Dippe, 2006), as tensions (Basharina, 2007; Berge and Fjuk, 2006), and as “historically accumulating structural tensions within and between activity systems” (Engstrom, 2001, p.137). Contradictions not only generate disturbances and conflicts, but also innovative attempts to change the activity (Engestrom, 2001).

Barab, Barnett, Yamagata-Lynch, Squire and Keating (2002) conceptualised tensions as system dualities and used the term systemic tensions instead of contradictions. Activity systems are constantly working through contradictions, and in that sense are virtual disturbances and innovation-producing machine(s) (Centre for Activity Theory and Development Work Research-CATDWR, 2003-2004, p.12). As Cole and Engestrom (1993) explain, in activity systems, “equilibrium is an exception, tensions, disturbances and local innovations are the rule and the engine of change” (p.8).

Contradictions emerge as disturbances, which are visible manifestations of contradictions (Capper and Williams, 2004) or “unintentional deviations from the script which cause ‘discordinations’ in interaction “and deviations from the observable flow of interaction” (Engestrom, Brown, Christopher and Gregory, 1991, p.91). They result in double binds in everyday practices when an individual receives “two messages or commands which deny each other” (Engestrom, 1987, p.174).

Contradictions are important, not in and of themselves, but because they can result in change and development (Engestrom, 2001). Engestrom and Miettinen (1999, p. 9) emphasise a view of contradictions “as a motive force of change and development”. Despite the potential of contradictions to result in

transformation of an activity system, this transformation does not always occur. In fact contradictions can either enable learning to progress or they can actually “disable” it, depending on “whether or not they are acknowledged and resolved” (Nelson, 2002, p.34). Additionally, in order for systemic contradictions to lead to innovation, their resolution cannot occur at the individual level, because contradictions are in social/material relations among groups of people and the tools they use.

Contradictions may not lead readily to transformations because they may not be easily identifiable or they may not be easily acknowledged, visible, obvious or even openly discussed by those experiencing them (Capper and Williams, 2004; Engestrom, 1993). Capper and Williams conceive of invisible and ‘undiscussible’ contradictions as “the most difficultto use as springboards for growth” (p.12) in relation to the context of work teams. From their perspective, “an invisible contradiction is taken for granted.....members of the group or community do not even recognise it as a difficulty and it includes cultural assumptions about how things are done and how relationships are managed” (p.12). On the other hand, ‘undiscussible’ contradictions are those that are not talked about because they are “embarrassing, uncomfortable, or even culturally difficult to confront” such as gender..... issues or offensive personal habits of politically powerful programme stakeholders” (p.12).

By focusing on the emergence of contradictions and on the way these are (un) resolved, activity theory thus allows us to gain some explanatory insights in the phenomena of resistance to educational innovation and barriers to pedagogical transformations resulting from the introduction of technology (Blin and Munro, 2008).

2 Methodology

A mixed methods research approach was used to undertake a MUELE-platform usage and activity analysis. Platform usage and activity analysis tools were used to collect data on the platform features, usage and activity types. Ten knowledge and skills building activity types that represent the development of PCK, CK and DC for pre-service teachers were adapted from (Harris, Mishra & Koehler, 2009) teachers’ technological pedagogical content knowledge and learning activity types and matched with MUELE-platform features. In addition, a questionnaire was administered to 80 teacher educators at the school of education. Observation and recording of MUELE-platform rules, conventions, and objects created and used by teacher educators was also undertaken to reveal tool and subject contradictions.

Understanding the formation and resolution of contradictions is central to our understanding of transformations that can lead to teacher educator practices that constrain or enable the development of pre-service teacher competences using

the MUELE-platform, therefore, data was analysed and interpreted within an activity theory framework of contradictions, tensions and transformation.

3 Findings

The activity theory concept of contradictions is used in this paper to illustrate how teacher educators changed/transformed their teaching practices and restructured their activity types (teaching/learning practices) using the MUELE-platform to supplement the traditional face to face lectures used in pre-service teacher training. The study was guided by the following research questions:

1. What features of the MUELE-platform are used by language teacher educators to facilitate pre-service teachers' development of PCK, CK and DC?
2. What MUELE- platform knowledge and skills development activity types are used by language teacher educators for developing PCK, CK and DC?
3. How do MUELE-platform user rules and conventions facilitate the development of PCK, CK and DC?

3.1 Features of MUELE-platform

Descriptive data on the MUELE-platform features analysis reveals the following interface features that can be used by teacher educators and pre-service teachers to facilitate the development of preservice teachers' competences. The MUELE-platform features include: course management guide for lecturers, Moodle community, and social network sites such as Facebook, twitter, Google, staff blogs and student chat. Specifically, the MUELE-platform features and activity analysis was undertaken to establish the platform features, and their usage in activity types that develop PCK, CK and DC among preservice teachers.

Table 1: Use of features of the MUELE-platform (%)

MUELE-platform features	Documentation	Post notes	Not a user
Course management guide for lecturers	20	47	33
Moodle community	17	10	73
Social network sites	20	52	28
Staff blogs	20	31	49
Facebook	16	26	58
Student chat	6	18	76
Google	28	48	24

Table 1 above shows that the course management guide for lecturers is the key MUELE- platform feature used by language education lecturers, the feature is mostly used for posting notes and content by 47% of lectures. However, 33% of the teacher educators are not users of this feature. On the use of other features of the platform, 73% are not using the Moodle community, 17% use it for documentation, and 10% for posting content. In terms of social network sites such as twitter, 52% use it to post notes, 20% use it for documentation and 28% are not users. Staff blogs are used by 20% for documentation, 31% for posting notes/content and 49% are not active users. On face book, 16% use it for documentation, 26% for posting notes/content and 58% are not users. Student chat, 6% use it for documentation, 18% for posting notes/content, and 76% are not users. Google 28% use it for documentation, 48% for posting notes/content and 24% are not users.

This data on the MUELE-platform features reveals tensions and contradictions underlying the use of the features in terms of subject and tool contradictions. While majority of the teacher educators (subjects) are passive users, the usage of the platform features is mostly for documentation and posting notes or content. The above platform features suggest a collaborative and constructivist approach to social learning, yet the subjects are using the tools (MUELE-platform features) majorly for instructive purposes of documentation and posting notes. Additionally, teacher educators prefer to use the course management feature of the MUELE-platform than using the collaborative social learning spaces which offer pedagogical affordances of social networking sites such as face book, twitter, blogs and Moodle community.

Table: 2. MUELE-platform Knowledge and Skills Development Activity Types Used by Teacher Educators

Activity	Activity Description	MUELE platform feature	%
1.Create text and course management information	Teacher educators post course outlines, course notes, and course related information. Post course management information from textbooks, teacher education documents, national syllabus, teaching subjects content	Course management guide for lecturers Web browsers, links to documents	39%
2.Create and post presentations	Teacher educators create and post presentations, resources for language education preservice teachers to access teaching subject content and pedagogical knowledge from lecturers, resource persons and peers	Presentation software, audio/video, podcasts and vod casts, slide share	26%
3.Create and post images	Create and post images for students to access both still and moving videos, animated images to develop preservice teachers content knowledge and methods of teaching	Image animation, video and display software	9%
4.Create and share audio resources	Create, share audio resources and recordings of lectures and speeches of key persons	Websites, mp3 players and podcasts	2%
5.Create and facilitate group	Create small and large group discussion forums for preservice teachers to	Discussion forums, blogs, wikis, chat	10%

discussion forums	engage in dialogue with peers	rooms	
6.Create and manage virtual field trips	Create and manage virtual sites connected with the teacher training curriculum	Videos, virtual reality systems, online museums, galleries and exhibitions	2%
7.Engage preservice teachers in inquiry	Engage pre-service teachers in generating questions related to content, pedagogy and concepts	Word processing, wikis, web quests, Google docs	3%
8.Engage preservice teachers in making presentations	Engage preservice teachers in making oral and multi-media format presentations to share their understanding of concepts, pedagogies, theories, processes and experiments	Presentation software, multimedia authoring tools, video, audio editing suites, voice threads	2%
9.Build and share models	Create and guide pre-service teachers to build representations of course concepts and processes and experiments	Modelling, graphic, simulation software, Multimedia production tools	3%
10. Simulation	Engage students in digital experiences of teaching and learning using classroom videos of lessons conducted	Video, virtual reality websites, simulation software and animations	4%

Data from Table 2, showing MUELE-platform activity types for developing PCK, CK and DC created by teacher educators indicates that, 39% of teacher educators create text and course management information, 26% create and post presentations, 10% create and facilitate online group forums, 9% create and post images, only 4% create simulations and engage students in digital experiences of teaching and learning, 3% engage language preservice teachers in inquiry in related teacher education content, pedagogy and concepts using MUELE-platform features, 2% create and share audio resources, 2% create and manage virtual field trips and 2% engage language education preservice teachers in making multimedia presentations.

This data on activity types reveals tensions and contradictions on activity types which should be created by teacher educators for the development of PCK, CK and DC among preservice teachers, leading to limited transformations in terms of adoption of learning with technology (MUELE-platform features). Engestrom (2001) referred to these activity types as tools for transformation. Since activity types are the tools which should be used to transform learning, the existing limited creation and use of activity types that make use of MUELE-platform features constrains the development of PCK, CK and DC among preservice teachers.

In relation to observed activity types created on the MUELE-platform, the primary activity types are discussion forums on general university community issues. The use of the MUELE-platform for pre-service teacher assignments, quizzes or collaborative/reflective activities such as wikis, reflective journals remains very marginal. This illuminates the notion of ‘discoordinations’ in interaction “and deviations from the observable flow of interaction” (Engestrom, Brown, Christopher and Gregory, 1991, p.91).

While activity types are the tools which should be used to transform learning, the existing limited creation and use of collaborative activity types that make use of MUELE-platform features by engaging pre-service teachers and teacher educators in collaborative learning spaces constrains the development of PCK, CK and DC among preservice teachers.

The activity theory concept of contradictions outlined above can be illustrated through the modelling and representation of the activities relating to the design, implementation and use of course units for teacher preparation created on the MUELE-platform. In Makerere university, a number activities/actions are undertaken in planning and delivering a course namely: communication among staff to plan a course; course planning meetings; planning and organising content and learning activities, writing up, producing learning materials, planning and developing resources for course evaluation and assessment; scheduling the course units; uploading course notes and resources on the MUELE-platform and producing/ printing course readers, hand outs, organising and implementing face to face sessions. These activities are

undertaken by the subjects of the design activity (i.e., individual lecturers or departmental teams, with support teams in the Electronic Learning Unit- (ELU) who are part of the wider university academic community.

3.2 Observed Tools and Subject Contradictions on the MUELE-Platform

Data from the MUELE-platform features analysis revealed that the course units represented on the MUELE-platform are individual lecturer's course notes, not departmental teams notes, although this reflects the commitment on the part of individual members of the academic community to enrich the students' learning experience, however, it is also an example of tensions, as well as subject/object/community contradictions as lecturers have not come up in course/departmental teams to develop course units to be uploaded on the MUELE-platform, illuminating the existence of tensions and contradictions within the subjects and tools.

Overall usage of the MUELE-platform as of July, 2014, taking statistics on the number of users and hits displayed on the platform as of 5/07/2014, indicates that academic staff, and very few students use the MUELE-platform in some way that is the application of learning technology in training pre-service teachers has not shifted from periphery to main stream. While the university policy recommends that the MUELE-platform should be used to facilitate a student-centred course delivery approach for supporting teaching and learning purposes, the MUELE-platform features and activity types analysis indicates that it is used by course lecturers for disseminating course related information, communicating with pre-service teachers and less on enabling student and staff collaboration. These illuminate contradictions in tools and subject, rules and subject, and division of labour and subject.

A further activity analysis of the objects created by teacher educators on MUELE-platform illuminates the practices of the academic community involved in the campus delivery of programmes of studies during the semester up to July, 2014. In the majority, there are limited course outlines, course notes, resources and activities for supporting learning. The bulk of resources created are in-house text-based content, such as word processing and pdf files. Very limited files exist in presentation software such as power point files, html pages, vodcasts and podcasts of past, current and prospective lectures and sessions.

This constrained creation of multi-media objects illuminates that the move away from traditional teaching methods towards self-directed learning on MUELE-platform or with learning technologies seems to contradict teacher educator's understanding of the division of labour within education settings earlier noted by (Scanlon & Issroff, 2005). This creates tensions, conflicts and

may not lead to transformations as preservice teachers have few tools in form of multimedia teaching learning objects and activity types to support self-directed learning.

3.3 Observed User-rules and Conventions of the MUELE-platform and the Development of PCK, CK and DC

The use and creation of activity types in form of teaching/learning objects by teacher educators is supported and motivated by the university information technology and communications policy, where all courses should have an online presence on the MUELE-platform. While this is the policy, a few course units course outlines are accessible on the platform highlighting tool/object/subject contradictions. The MUELE-platform version 2.5 is supported by Moodle, the platform address is www.muele.ac.ug. Social constructivism and ‘connectivism’ are the pedagogical approaches underpinning MUELE-platform, these approaches are also in line with the Makerere university teaching and learning philosophy.

Responsibility for the MUELE-platform administration and management resides jointly with the Directorate of Information Communication Technology Systems–(DICTS) and ELU department within the university. DICTS are responsible for hosting the platform and for technical support. The ELU are responsible for dealing with day-to-day technical and pedagogical inquiries and for provision of training in both technical and pedagogical aspects of the platform and software.

Formal training for staff and students for the whole university focuses on the practical aspects of using the system through weekly face-to-face sessions. Online tutorial training are also offered during semester time for staff and students for accessing and using MUELE-platform. Questions still remain unanswered on whether the trainings have equipped teacher educators with the necessary MUELE-platform tool related competences (i.e., knowledge about the functionality of a tool as well as skills necessary to operate it, and task-related competences (i.e., knowledge about the higher level goals attainable with the use of a tool, and skills of translating into the tools functionality (Kaptelinin & Nardi, 2006).

In order to create and use MUELE-platform features efficiently both the teacher educators and pre-service teachers also need what Kaptelinin and Nardi (2006) call *meta-functional* competences, which “enable the [subjects] understanding of how to use functional organs of a tool, recognise their limitations and knowing how to maintain and trouble shoot them” (Kaptelinin & Nardi, 2006, p.218). These competences will allow teacher educators to resolve the contradictions and tensions in ways that enable transformative motive of contradictions leading to creation of teaching learning activities,

spaces, objects and opportunities that can enable the development of language education preservice teachers' competence development.

The MUELE-platform allows specific roles and an associated set of permissions to be assigned to each user of the platform. The user roles include: administrator; course lecturer; and student. The administrator has universal access, that is, they can make global changes that affect the configuration of the platform and have access to user details. Administrative access is limited to staff in DICTs and the ELU. Course lecturers have limited administrative permissions only limited to creating new courses and resources on the platform, connecting with the Moodle community, interact, collaborate and communicate with language education preservice teachers and colleagues. Preservice teachers can access the course content, course related information, resources and collaboratively interact with lecturers and fellow students' community registered within the same course. Course lecturers are encouraged to participate on the MUELE-platform Moodle community through a dedicated Moodle community facilitated by the Moodle community support section.

As noted by Blin and Munro (2008) "the decisions to implement electronic learning environments in majority of higher education institutions is often a response to the often conflicting impact of market driven influences and a deep institutional or individual commitment to enhance students' learning experiences and outcomes" (p.479). However, the successful implementation of MUELE-platform depends on the quality of the learning activities and objects designed for the platform and their integration into the curriculum.

Taking on Blin and Munro's (2008) interpretation of tensions, obstacles to successful implementation of technology in education, teacher educators cited the following as challenges that constrain their use of the MUELE-Platform:

'Limited broadband width to support access to MUELE-platform resources, for example, the platform cannot play videos, audio, animations during semester time'.

'Few computers limiting access to computers by all preservice teachers while at the university.'

'Limited MUELE-platform features/tool and task related competences by both teacher educators and pre-service teachers'

These challenges can be seen as "manifestations of deeper systemic tensions within or between elements of activity systems as well as between interacting activity systems" (Kirkup and Kirkwood, 2005, p. 195), and need to be resolved to enable MUELE-platform to transform the pedagogical practices of teacher educators, which can subsequently lead to development of pre-service teachers' PCK, CK and DC.

4 Discussion, Conclusion and Recommendations

Taken together, although preservice teachers are given additional opportunities to engage with course related topics through the created course notes on the platform, teacher educators generally appear to prefer the online documentation and distribution of course-related documents which is instructive, rather than the creation of interactive and collaborative learning objects, spaces, resources and opportunities that can potentially lead to online construction and manipulation of course content by preservice teachers, limiting the potential of the MUELE-platform to facilitate the development of competences, illuminating tools, rules and subject contradictions.

On the other hand, while teacher educators are using the MUELE-platform to electronically disseminate materials previously distributed in print, such as course outlines, lecture notes, and course related information to preservice teachers, is a replication of face to face delivery online, and this seems to be what the teacher educators interpret as integration and use of technology. This finding is in agreement with, Unrwin (2008) earlier finding that the “majority of institutions in Africa claiming to be using e-learning are not using an integrated formal learning management system at all, but are rather using basic digital technologies...more often than not interpreting e-learning simply as accessing information from the web” (Unwin, 2008, p.4-5). This suggests that little transformation has taken place, tensions and contradictions still exist that limit the transformation of teaching/learning practices with the use of technology.

The MUELE-platform features and activity analysis also reveals a low uptake of more advanced features and functionalities of the platform, this is exemplified by the activity types and usage of the MUELE-platform features for documentation and uploading of course related information and do not use MUELE-platform course management system for creation and use of collaborative activities. This suggests either a lack of familiarity with the MUELE-platform functionalities and features or lack of perceived need for the use of the features/ functionality to change ones’ teaching practice. This alludes to Capper and Williams, 2004; Engestrom, 1993) notions of invisible and ‘undiscussible’ contradictions in relation to the context of work teams, wherein, the non-use of advanced MUELE-platform features is an invisible contradiction and is taken for granted by the teacher educators, or even do not recognise it as a difficulty. This contradiction is not transformative and therefore might not lead to development of preservice teachers’ competences.

The MUELE-platform features, usage and activity analysis reveals that there are contradictions and tensions between and among tools, subjects and rules, and that these are exacerbated by limited teacher educators’ and language

education preservice teachers' meta-functional competences and systemic challenges such as broadband width and access to computers, but that there are, at the same time, important learning (as well as management and teaching) benefits that can be gained that can facilitate pre-service teachers' development of PCK, CK and DC if the existing contradictions are collaboratively and systematically addressed and resolved.

Implicit in the findings is the need for high broad band width and technical support for teacher educators in the creation of activity types, digital teaching/learning objects and use of the MUELE-platform features for facilitating the development of PCK, CK and DC among preservice teachers. This paper shows that the MUELE-platform has the potential to provide an architecture that will allow language education preservice teachers not only to have more access to content and collaborative e-tivities from their subject areas and professional courses but also to develop technological pedagogical competences. More interview and questionnaire data needs to be collected to develop a comprehensive understanding of teacher educators and preservice teacher perspectives on how the use and creation of digital resources on the MUELE-platform can be facilitated and developed.

Acknowledgements

The authors wish to thank the Mellon/ Carnegie Scholarship Fund for sponsoring them to pursue a Postgraduate Diploma in Educational Technology at the University of Cape Town where activity theory and the concepts of technologically-mediated instructional and learning environments in teacher education discussed in this paper were nurtured.

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