
High School Teachers' Beliefs about Learner-Centred E-learning

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ABSTRACT This article reports on a study conducted to gain insight into teachers' beliefs about e-learning. Data collection relied on discussions conducted with 16 teachers from six high schools in two adjacent municipalities of one Canadian province. Data collection and analysis were guided by a framework of research-validated, learner-centred principles. Teachers' beliefs portrayed learners as digital natives who actively consume information and knowledge, engage emotionally with technology, and devote themselves to it. Beliefs about teaching referred to teachers as guides and mediators in the knowledge process who can give creative control of the technology, engage learners, and promote higher-order thinking skills. Beliefs about the Internet highlighted its potential to provide unlimited, authentic, purposeful, relevant, participatory, and individualized learning that can take place outside the classroom.

Introduction

Learner-centred instruction constitutes one theoretical perspective relevant to learning environments relying on electronic tools, together with other perspectives such as constructivism and sociocultural theory (Bonk & Cunningham, 1998). In relation to learner-centredness, McCombs (2000, p. 12) highlights the challenge of designing educational systems where technology 'is in service to, values, and supports diverse learners and learning context'. According to McCombs, the learner-centred principles (LCPs) (American Psychological Association Presidential Task Force on Psychology in Education, 1993; Learner-Centered Principles Work Group of the American Psychological Association's Board of Educational Affairs, 1997) constitute one framework that can provide insights into learner-centred practices in educational contexts of e-learning. E-learning has been defined as 'the use of information and communications technology (ICT) to support learning' (Usoro & Abid, 2008, p. 75).

The LCP framework is especially valuable to help build learner-centred schools and transform current educational practices with technology because it can help identify a role for technology that evolves from research-validated principles and practices (McCombs, 2000). McCombs (1997, p. 5) has also linked learner-centeredness to the 'beliefs, characteristics, dispositions, and practices of teachers'.

Although McCombs and others (for example, Bonk & Reynolds, 1997; McCombs, 2000; McCombs & Vakili, 2005) have discussed how the LCPs can be applied to technology use in education, there are, to date, few empirical studies of the LCPs and e-learning. The need for research into the LCPs and e-learning is supported by this paucity of research and, additionally, by the fact that the principles were developed in the pre-Internet era and were not originally formulated specifically in relation to e-learning.

The study reported on in this article was conducted to gain insight into high school teachers' beliefs about e-learning. Our enquiry was guided by the following question: What might be some high school teachers' beliefs about e-learning? Beliefs have been described as a 'particularly provocative form of personal knowledge' (Kagan, 1992, p. 74) lying at the heart of teaching. By

becoming aware of their beliefs, teachers can understand their implicit educational theories and how these influence their practice (Williams & Burden, 1997). For our enquiry, we conceptualized teachers' beliefs as teachers' personal theories (see Fox, 1983) or truths about learning and teaching. We conducted nine discussions in which a total of 16 high school teachers were involved. Seven discussions were conducted with two teachers at a time. Two discussions were conducted with one teacher at a time. The participating teachers were from six different schools in two adjacent municipalities in one province of Canada.

We begin with an overview of theoretical and empirical literature on the LCPs, with particular attention to the role they might play in understanding and shaping e-learning. A description of methods follows. Findings are grouped according to the four dimensions of the LCPs. We discuss the findings by comparing them with the LCPs and conclude with some implications for practice and research, as well as the limitations of our study.

The Learner-Centred Principles: a theoretical overview

The LCPs were developed in the 1990s by the Presidential Task Force on Psychology in Education organized by the American Psychological Association (APA) and the Mid-Continent Regional Educational Laboratory (McREL). The work of the task force was motivated by a perception that theoretical and empirical developments on learning, development, and motivation had had little impact on school reform (Bonk & Cunningham, 1998). This work resulted in the publication of the *Learner-Centered Psychological Principles: guidelines for school redesign and reform* (American Psychological Association Presidential Task Force on Psychology in Education, 1993). The principles integrate various areas in psychology, including developmental, educational, experimental, social, clinical, organizational, community, and school psychology (Learner-Centered Principles Work Group of the American Psychological Association's Board of Educational Affairs, 1997). Originally, 12 principles were identified, which became 14 in a subsequent revised version of the LCPs (see *Learner-Centered Psychological Principles Revised*, 1996; Learner-Centered Principles Work Group of the American Psychological Association's Board of Educational Affairs, 1997).

McCombs (2003, p. 94) describes the LCPs as 'a research-validated knowledge base about learning and learners'. The principles are grouped into four dimensions of human functioning during the learning process, organized as follows: (a) cognitive and metacognitive factors; (b) motivational and affective factors; (c) developmental and social factors; and (d) individual differences factors. For each of the principles, we provide a summary based on the literature:

- (a) *Cognitive and metacognitive factors*: the learner constructs meaning and links new information with existing knowledge, applies a repertoire of learning strategies including higher-order strategies, pursues personally relevant goals, and is influenced by the context of learning.
- (b) *Motivational and affective factors*: motivation is influenced by emotional states and learners' beliefs about themselves as learners, and is facilitated by meaningful, real-world tasks with choice and control that are appropriate in difficulty. Learner effort and commitment is an indicator of motivation.
- (c) *Developmental and social factors*: learning is most effective when developmental levels, across intellectual, emotional, and physical domains, and social interactions are taken into account, creating a positive climate for learning.
- (d) *Individual differences factors*: learning is most effective when learners examine their learning preferences, appraise their strengths and weaknesses, receive assessment at all stages of the learning process, and when they perceive that their linguistic, cultural, and social backgrounds are taken into account.

The Learner-Centred Principles: a synthesis of empirical research

The framework of the LCPs has provided a lens to investigate a variety of constructs such as self-esteem (for example, Moore, 2003), knowledge construction (for example, Schuh, 2003), or reflective thinking (for example, Statler & Petersen, 2003). In some cases, studies have not

investigated a construct but have compared learner-centred and non-learner-centred classrooms (for example, Daniels et al, 2001; McCombs, 2001; Schuh, 2003).

The LCPs have been used to conduct research at all levels: kindergarten and primary/elementary (for example, McCombs & Quiat, 2000b; Daniels et al, 2001; Weinberger & McCombs, 2001; Daniels & Perry, 2003; Schuh, 2003; Kim et al, 2004; Crick & McCombs, 2006), middle school/intermediate (for example, Fasko & Grubb, 1997; Weinberger & McCombs, 2001; Statler & Petersen, 2003), secondary (for example, Fasko & Grubb, 1997; Crick & McCombs, 2006), and postsecondary (for example, Vakili, 2003; Ware, 2006). Weinberger & McCombs (2003) argue that attention to the secondary level is needed in order for educators to transform practices towards learner-centredness.

In terms of the methods adopted, a common approach has been to use self-assessment and reflection surveys such as the Assessment of Learner-Centred Practices (ALCP) (for example, McCombs & Lauer, 1997; McCombs & Quiat, 2000a,b; Daniels et al, 2001; Weinberger & McCombs, 2001; Daniels & Perry, 2003; Meece, 2003; Kim et al, 2004). These studies typically include teachers' self-assessments and comparison of teachers' and learners' beliefs in order to help teachers identify areas for change of practice. The purpose of the surveys is 'to provide a set of self-assessment tools to assess beliefs and practices in the area of learning and development' (Vakili, 2003, p. 85). The surveys consist of statements for which respondents indicate their extent of agreement or disagreement on a Likert-type scale. One example of a statement in the teacher survey is the following: 'It's impossible to work with students who refuse to learn' (see McCombs, 1999; McCombs & Pierce, 1999). Our study differs from this approach in that we did not rely on survey instruments to collect data. There are limitations related to the use of surveys or questionnaires to elicit teachers' beliefs (see Weinstein, 1989; Borg, 2006). One limitation is the potential for misunderstanding of survey or questionnaire items. In addition, these data collection instruments might not provide an accurate or in-depth view of teachers' beliefs. As Patton (2003, p. 16) has observed: 'statistical data provide a succinct and parsimonious summary of major patterns and are easily aggregated for analysis, while qualitative research such as case studies provide depth, detail and individual meaning'.

The Learner-Centred Principles and Technology: a theoretical overview

McCombs (2000) notes that contexts of technology-enhanced education, such as distance learning, provide opportunities for learner-centredness. McCombs & Vakili (2005, p. 1597) refer to the potential of technology to 'change the role of teachers to that of colearners and contributors to the social and interpersonal development of students, counterbalancing the potential of computer technology to cause personal and social isolation and alienation'. The potential of the LCPs for Web-based instruction in particular has been highlighted (for example, Wagner & McCombs, 1995; Bonk et al, 1996; Bonk & Reynolds, 1997). In relation to the LCPs and distance education, McCombs & Vakili (2005) argue that the principles can be used as a framework to establish criteria to design experiences in distance programs. They also provide recommendations and implications organized around the four dimensions of the LCPs.

Research based on the LCPs can provide insights into the transformation of teacher practices. Crick & McCombs (2006, p. 428) explain the contribution of studies that use the LCPs to assess teacher practices in those terms: 'By helping teachers to engage in a process of self-assessment and reflection, a respectful and non-judgmental impetus to change is provided.' The LCPs can also help us to understand learner motivation and achievement (Fasko & Grubb, 1997).

The Learner-Centred Principles and E-learning: a synthesis of empirical research

Bonk & Cummings (1998) focused on learners' perspectives in formative and summative evaluations of Web-based courses designed and implemented according to the LCPs. They used the evaluations to formulate recommendations specifically for learner-centred, Web-based education. Whereas Bonk & Cummings explained that the design of the courses was influenced by the LCPs and that their recommendations were based on teaching the courses, they did not provide details on methods. Some of their recommendations for Web-based learning included the

following: establishing a sense of community, deeper learner engagement, choice, facilitation, public and private forms of feedback, electronic mentoring and apprenticeship, use of recursive assignments that build on personal knowledge, clear expectations and prompt task structuring, and portfolio assessment.

Ware (2006) conducted a qualitative study of the perceptions of postsecondary learners and instructors with regard to learner-centred pedagogy and Web-based learning. She compared learner and instructor perceptions of learner-centred practices in online and traditional courses of the same instructors throughout one semester. Her study relied on both quantitative and qualitative data. Quantitative data were gathered using the teacher and learner versions of the ALCP battery (McCombs & Pierce, 1999) as well as a learner evaluation of the instruction instrument used by the university where the study was conducted. Qualitative data were gathered through interviews with instructors. The interview protocol was based on a checklist used by the university to assess online courses. The focus was on each instructor's pedagogical beliefs about learner-centred instruction in face-to-face and online courses. Findings revealed that the degree to which learners perceived the courses as learner-centred indicated a positive relationship between the levels of learner-centred practices and learners' motivation and satisfaction with the courses.

Vakili (2003) conducted a study of learner-centred practices and motivational variables in face-to-face and online postsecondary educational contexts. Data collection relied on the ALCP instruments – both the learner and instructor surveys. Findings revealed that, regardless of the medium, learners did not perceive differences between the two contexts on factors such as: establishing positive interpersonal relationships, adapting to class learning needs, facilitating the learning process, providing for individual and social learning needs, and encouraging personal growth and responsibility. The author concluded that the findings challenged 'the myth that instructor practices cannot be effectively conveyed online' (Vakili, 2003, p. iii).

Somerindyke (2001) conducted an ethnographic case study on the provision of computers to learners in a fourth-grade classroom. Data were analyzed using the 14 LCPs. Somerindyke found that technology allowed the learners to engage in activities that covered a range of cognitive abilities and related to high learner motivation and engagement. Findings also pointed to more learner-centred practices when computers were in high use. Computers constrained learning and limited engagement in collaborative learning activities.

Studies of the LCPs and e-learning can have different foci, such as evaluating a course or program relying on technology, comparing face-to-face versus online teaching, and identifying and interpreting teacher and/or learner beliefs and perceptions in relation to e-learning and learner-centredness. Our study adopted the latter focus in order to centre on teachers' beliefs about e-learning. It differs from other studies of the LCPs conducted in contexts of e-learning (for example, Vakili, 2003; Ware, 2006) in that we did not rely on the ALCP survey instruments to collect data.

Methods

Research Design

We relied on case study design for the purpose of our enquiry. As Flyvbjerg (2006) argues, at the heart of case study lies the type of context-dependent knowledge and experience which defines expert activity. In the teaching profession, 'well-chosen case studies can help ... achieve competence, whereas context-independent facts and rules will bring the [professional] just to the beginner's level' (Flyvbjerg, 2006, p. 222). We designed our study as an intrinsic case undertaken to gain a deeper understanding of the case, without want of generalization or theory building (Stake, 2000).

Participants

Participants were recruited from six high schools in two adjacent municipalities. Sixteen teachers, 11 males and five females, volunteered to participate. The teachers represented seven subject areas as follows: language arts, science, social studies, technology, mathematics, theatre, and French as a second language. Some individuals taught two subjects, for example science and technology. The levels of teaching experience varied. Two participating teachers were heads of their department.

Data Collection

Nine discussions of approximately 60 minutes in length each were conducted between November and December 2007. We conducted seven group or paired discussions with 14 teachers and two single discussions for a total of 16 teachers. The single discussions (i.e. between the principal investigator and one teacher only) were necessary because, in two cases, the paired teacher could not attend. We aimed to pair the teachers based on similar subject areas where possible: for example, two language arts teachers or a science and a mathematics teacher.

Discussions conducted in the form of focus groups can help obtain in-depth information about a relatively unexplored concept (Seal et al, 1998). The dynamics of focus groups can stimulate discussion and generate a broad range of ideas, particularly, as Morgan (1997, p. 11) notes, when a topic might be 'either habit-ridden or not thought out in detail'. In the context of our study, we considered that group discussions might help elicit beliefs, which can be difficult to investigate. As Pajares (1992, p. 314) argues, beliefs 'cannot be directly observed or measured but must be inferred from what people say, intend, or do'.

Participants were told in advance that the discussion would be about learner-centred e-learning in the classroom. However, they were not explicitly told that the goal of the study was to gain insight into their 'beliefs' on e-learning. They were prompted to share their insights related to the four dimensions of the LCPs and were encouraged to build on the ideas and insights of the other teacher present in the discussion, which they did. As much as possible, the principal investigator aimed for an equal length of time for discussion for the four dimensions of the LCPs. Sample prompts for the discussion are as follows: 'Tell me about using the Web or other forms of technology: to cater to individual differences; to allow learners to go beyond simply description or understanding to engage them in critical thinking.'

Data Analysis

The data were broken into units of meaning or thematic units (Henri, 1992). The unit of meaning is 'a statement or a continuous set of statements, which convey one identifiable idea' (Aviv, 2001, p. 59). In this study, each unit of meaning corresponded to one or more sentences in the transcripts of the discussions. The process of breaking text into units of meaning resulted in a total of 105 units.

Two coders worked independently with the discussion transcripts to assign each unit to one of the four dimensions of the LCPs. This process led to consistent coding of 74 of the 105 units. For the 31 units not coded consistently by the two coders, the coders met and discussed each of these units individually until they agreed upon a common code. Once they had labelled each unit as belonging to one of the four LCP dimensions, they then cut and pasted it together with other units belonging to the same dimension. Units that articulated the same meaning were combined. Units that articulated similar meanings were juxtaposed. A second analysis was then conducted within each dimension to identify themes for each of the four dimensions. Each theme consisted of similar units, which were synthesized and which are presented in the following section. We retained as much as possible the exact wording of the original transcripts.

Participating Teachers' Beliefs about Learner-Centred E-learning

We present the beliefs according to the four dimensions of factors related to the LCPs: (a) cognitive and metacognitive; (b) motivational and affective; (c) developmental and social; and (d) individual differences. The beliefs are grouped together in themes. We labelled each theme with a proposition designed to synthesize the theme.

(a) Cognitive and Metacognitive Factors

Teachers' beliefs related to cognitive and metacognitive factors are as follows: learners are digital natives; the Internet offers an opening of the world and unlimited learning; learners are active consumers of information and knowledge; teachers' use of technology can encourage higher-order thinking skills; and teachers are guides and mediators in the knowledge process.

Learners are digital natives. The difference between a learner today versus 40, 30 or 20 years ago is the ubiquitous presence of technology. Learners live and breathe it daily. They were brought up on computers and are very comfortable as 'digital natives'. Technology is a part of what they do and who they are. It is not outside of them, it is them. They do not find so much that it is a motivating thing as it is a defining thing. It is their world and what they do on a daily basis.

The Internet offers an opening of the world and unlimited learning. Textbooks are one person's perspective, whereas the Internet provides an opening of the world at learners' fingertips and unlimited learning. Learners can go to a particular site on any topic and come back with an astounding amount of information that they did not know before or that the teacher is not even aware of. The presentation of information on the Internet is more real and current than chalk diagrams. Many websites deal with abstract topics in a way that it is impossible to do in a classroom. Learners are not using the reference books in the library because everything else is so much more immediate on the Internet.

Learners are active consumers of information and knowledge. Learners are less passive and more active. They are now expected to go out, access knowledge, and bring it back. They will come to conclusions and discover on their own. Technology has changed how learners view information generally. They view it now as a consumable, as opposed to something that an authority figure has handed them as valuable, and this changes how they treat information.

Teachers' use of technology can encourage higher-order thinking skills. Teachers cannot use technology for the same reasons they use paper and pencil but in order to get into higher-order thinking skills and make learners think more deeply. When using technology, teachers have to make sure that their curriculum and planning right from the beginning has the capability to encourage higher-order thinking skills. Learners can show evaluation and thinking skills that could not be presented as easily without technology.

Teachers are guides and mediators in the knowledge process. The teacher is not the giver of information, an imparter of knowledge, or knowledge holder. The teacher is only one of a myriad of sources and a facilitator or guide in the knowledge process. The teacher poses a question but, instead of providing the answer, asks learners to go find the answer, giving them opportunities to find their own way. Teachers mediate so that there is a critical lens brought to the Web content for learners to distinguish the quality from non-quality and to consider alternative viewpoints.

(b) Motivational and Affective Factors

Participants' beliefs related to motivational and affective factors can be synthesized as follows: learners engage emotionally with technology; learners devote themselves to technology; teachers need to be part of the learners' world; teachers can give creative control of the technology and engage learners; technology supports authentic, purposeful, relevant learning; and technology offers learning experiences outside the classroom.

Learners engage emotionally with technology. Learners who are very hard to motivate become engaged and glued to the screen of a computer and embrace technology wholeheartedly. The more complex or challenging it is, the more they love it. Shy learners are much more comfortable and learners who are normally lost or miscast shine in a technology environment. Their confidence level increases exponentially. They are changed in their heart, are excited and have a desire to come to class and learn. They take pride in creating products with technology and seeing their work online for public display. Creating with technology is good for their self-confidence and other learners look at them in a different light.

Learners devote themselves to technology. Learners will spend countless hours sitting down, at whatever technology game or item of technology, perfecting and playing with it, endlessly, digging

deeper into topics. Creating videos and posting them for their friends is not work to them. Technology is one thing they do not seem to have a tolerance level for. Learners would rather spend an hour staring at the computer screen going through exercises than they would with the old-fashioned pen-and-paper route, sitting at their desk in the classroom. Teachers who put efforts into technology will have the learners' undivided attention.

Teachers need to be part of the learners' world. The more teachers stick to talk and chalk, the more they lose learners. To make learning more meaningful, to inspire and engage learners, teachers have to look at their own lives and experiences, and identify the elements that brought them to that place where time disappeared and flew. They need to reflect the learning behaviours that learners value and be part of the world that learners are living in, and embrace the new environment that the Internet has created.

Teachers can give creative control of the technology and engage learners. Teachers can let learners explore and pick which topic they are most interested in. When teachers allow learners to create elements on their own, they will get much more. Learning becomes exciting and engaging when teachers give learners wiggle room to create with technology, allow them freedom, and leave the assignment as open-ended as possible. With technology projects and online activities, learners can take control, make an intelligent choice, let their creativity take over, and show the teacher what they got from the project.

Technology supports authentic, purposeful, relevant learning. With technology, learners can have a real, live experience they can relate to which generates their interest and motivation and still meets the outcomes. With a real audience for their work, learners' writing changes because they have a purpose and they have to be clearer. Instead of just doing assignments to get the marks, they learn by preparing, and the learning is personally relevant and stays with them. It is unlike something that is memorized, shallow and they forget trying to get through a test.

Technology offers learning experiences outside the classroom. Online spaces that live outside the classroom and are no longer for the sole purpose of evaluation can take on a life of their own and become an experience for learners outside of academics that they enjoy and look forward to. Learning becomes a genuine experience because learners can relate to the experience with technology not only in their school environment and their scholastic studies, but in their outside world.

(c) Developmental and Social Factors

We coded only one category of beliefs into the dimension of developmental and social factors, as follows: technology is creating a more participatory learning system.

Technology is creating a more participatory learning system. Technology is creating a more participatory learning system without the teacher being the sole deliverer of learning. With technology, learners pay attention to other learners and understand them better than they would a textbook or a teacher. Using the Internet, learners can work together, communicate, support each other, and share tools and information. Learners can share learning with family members or with a group of learners in another province. Reverse education and shared learning occur when learners bring in material, which gives them a sense of empowerment and creates a heightened interest in the material. Teachers can create magic with technology by providing opportunities for learners to pursue what interests them and to collaborate with each other.

(d) Individual Differences Factors

We labelled three categories of beliefs under the dimension of individual differences. These are: technology can make learning more individualized; technology supports various learning styles,

strengths, and intelligences; and teachers have to develop new ways of evaluating that motivate learners.

Technology can make learning more individualized. Technology takes what used to be one teacher teaching 30 learners, who are all learning the same thing, the same way, at the same time, to make learning more individualized. Faster learners can more quickly move to a higher level and slower learners can learn at their own pace without the fear that people might judge them. Asynchronous tools allow learners to do assignments at their own pace with the teacher coming to help if there is a problem.

Technology supports various learning styles, strengths, and intelligences. For learners who are really weak, struggle, or who are learning-disabled, technology breaks down barriers that keep them from thinking that they cannot learn. A non-threatening online environment opens up to individual learning styles, such as visual or auditory styles. Learners can access it at their leisure and communicate and support each other. Technology taps into their creativity and use of different intelligences. Some learners are more apt to pencil and paper and others are more creative. Learners can succeed with their strengths, for example, by one learner with a strong technological background working together with a learner with a good communication background.

Teachers have to develop new ways of evaluating that motivate learners. When teachers are strong in their curriculum, they can see what the outcomes are and evaluate them easily using technology. To appreciate individual differences, teachers have to develop new ways of evaluating that are not just based on paper and pencil, which show understanding in more ways than just reading and writing, and motivate learners to learn. Teachers can pass out assignments listing several options, such as creating a web page or a graphical representation. They will still be meeting outcomes quickly, easily, and in a motivating way for learners.

Discussion

The beliefs reflect many of the constructs that are part of the LCPs, such as higher-order thinking, information, acquiring and integrating knowledge and information, effort, relevance, motivation, emotion, creativity, interactions, collaboration, relationships, learning preferences and styles, and evaluation and assessment. We did not identify any beliefs that reflect the LCPs' emphasis on learners being goal-directed, using strategies to meet their goals, or engaging in metacognitive reflection. The beliefs emphasize learners' access to and consumption of information more so than the production, construction, and creation of knowledge. The LCPs, in contrast, move beyond access to or consumption of knowledge and refer instead to constructing meaning from information. The role of educators, according to the LCPs, is assisting learners in, not only acquiring knowledge, but integrating it with their prior conceptions, experiences, and beliefs.

The role of educators, according to the participants' beliefs, is to help learners filter, critique, and evaluate information. In this regard, the beliefs reflect a traditional conception of learning as transmission of information as opposed to learning as knowledge construction, or as opposed to what McCombs (2000) refers to as learners as 'knowledge generators'. Instead of teachers transmitting knowledge, the role has passed to technology. In this regard, we could say that while the conduit has changed, the process has not. The teachers' role becomes less central in that they are guides who help learners access and filter the information and knowledge.

Beliefs centred around teachers highlight a need for a change in behaviours that makes their role less central and shifts control to learners. The beliefs express the need for teachers to empathetically relate to learners and their world. They express the need for a shift towards more meaningful and motivating forms of evaluation by teachers. It is with regard to a context of evaluation and assessment that the teachers' beliefs relate the potential of e-learning to help learners become, not so much knowledge consumers or even 'knowledge generators', as in McCombs' (2000) conceptualization, but knowledge creators.

The beliefs related to e-learning and, in particular, the Internet highlight the new types of learning made possible by the new tools and environments. There was no nostalgia expressed with

regard to the old classroom tools. In fact, teachers' beliefs reflect an implicit rejection of the traditional classroom tools such as the textbook, chalk and talk, and library encyclopaedias in favour of more open tools offered by the Internet.

The participating teachers' beliefs about e-learning and learner-centredness highlight some of the constructs that might be relevant to the LCPs if they were to be articulated in e-learning contexts. While the principles refer to the context of learning and the need to be aware of the learner as an individual, they do not mention how technology might be shaping learners. McCombs & Miller (2007, p. 72) argue that 'education must address the whole child'. Addressing the whole child may mean understanding learners as 'digital natives'. The LCPs, as well as the participating teachers' beliefs, emphasize the change in the role of the teacher. Unlike the LCPs, teachers' beliefs, however, also emphasize a change in the classroom tools and environment. That change provides an opportunity to reconceptualize how traditional classroom processes and procedures take place. For example, learners' direct, disintermediated access to powerful electronic tools and access to information may actually support a more learner-centred approach.

Conclusions

We identified three sets of beliefs that relate directly to learners, teachers, or technology, as follows:

- Learners are digital natives who consume information and knowledge, engage emotionally with technology, and devote themselves to it.
- Teachers are guides and mediators in the knowledge process. They can give creative control of the technology, engage learners, and involve higher-order thinking skills. They have to develop new ways of evaluating that motivate learners and they need to be part of the learners' world.
- Technology (in particular the Internet) offers an opening of the world, unlimited, authentic, purposeful, relevant, participatory, and individualized learning that can take place outside the classroom. It supports various learning styles, strengths, and intelligences.

In terms of implications for the teachers in this case study, to align their beliefs more with the LCPs might require a focus on how to promote learners' goal-directed, self-regulating learning. Professional development (PD) opportunities might also focus on how they can help learners develop, apply, and assess their strategic learning skills and engage in thinking about their thinking. PD opportunities might also focus their attention on teachers' and learners' relationship to knowledge and information, and how they can help learners move towards more generation, creation, and construction of knowledge as opposed to simply consumption. PD opportunities might also provide opportunities for the teachers to reflect on, and even develop, plans for how they can translate their beliefs into classroom practices.

In terms of implications for research, our study was limited to one small case in which only discussions and not observations were conducted. We do not know if, indeed, teachers' beliefs as they reported them actually relate to their behaviours in the classroom. Follow-up observations of teachers or teacher self-reports of observations of their own or each other's teaching might provide a more holistic and accurate portrait of e-learning. Our findings may have been different if we had conducted individual discussions or interviews with teachers. Our findings may also have been different had we specifically referenced all of the aspects of each dimension (for example, goal-directed, reflective, or strategic learning).

In the context of our study, group discussions with two teachers at a time helped elicit teachers' beliefs. However, this data collection technique might present some limitations, in that it may have resulted in one teacher's beliefs being influenced by the other teacher. Our study did not take into consideration the beliefs of learners about e-learning. Discussions with learners combined with observations might present a further occasion to gain insight into learner-centred practices in contexts of e-learning.

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