University-based coach education: the use of digital technologies to provide a learner-centered teaching
Formación de entrenadores/as en la universidad: el uso de tecnologías digitales para proporcionar una enseñanza centrada en el estudiante

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Abstract

Introduction: There is a trend in coach education programs (CEP) toward the use of learner-centered approaches, particularly in the university. Moreover, the growth of online CEP have been stimulated, in response to the technological evolution in the 21st century. However, studies that discuss the use of digital information and communication technologies (DICT) to foster learner-centered coach education approaches are rare.

Objectives: (a) to present a framework for Learner-Centered Teaching (LCT) and guidelines for the use of DICT in line with this approach; (b) to present and discuss proposals for the use of DICT that can enable a learner-centered approach in CEP, particularly for the university context.

Development: We reflect on the implications of the use of DICT to provide a learner-centered university-based CEP, by proposing seven practical principles: 1) empower teachers in terms of LCT knowledge and DICT ability; 2) provide a supportive and feedback-rich environment using different DICT; 3) provide opportunities for control and choice of DICT by student-coaches; 4) consider the student-coaches' previous knowledge regarding the content of the course and DICT; 5) include different options for DICT in the teaching-learning process; 6) use DICT to create environments for collaboration and discussion between teacher and student-coaches; 7) evaluate the effectiveness of technology to meet the diverse and emerging needs of student-coaches.

Conclusions: For DICT be an integral part of educational changes, teachers must understand LCT principles that are embedded in technology applications. By using DICT, teachers can delivery content in a more flexible way, creating online learner-centered environments.

Keywords

Coach development; higher education; learning; physical education.

Resumen

Introducción: Existe una tendencia en los programas de formación de entrenadores (PFE) hacia el uso de enfoques centrados en el alumno, particularmente en la universidad. Además, el crecimiento de los PFE en línea se ha visto estimulado, en respuesta a la evolución tecnológica en el siglo XXI. Sin embargo, los estudios que discuten el uso de las tecnologías de la información y la comunicación digitales (TICD) para fomentar enfoques de formación de entrenadores centrados en el alumno son raros.

Objetivos: (a) presentar un marco para la enseñanza centrada en el alumno (ECA) y pautas para el uso de TICD en línea con este enfoque; (b) presentar y discutir propuestas para el uso de DICT que puedan permitir un enfoque centrado en el alumno en PFE, particularmente para el contexto universitario.

Desarrollo: Reflexionamos sobre las implicaciones del uso de TICD para proporcionar un PFE universitario centrado en el alumno, proponiendo siete principios prácticos: 1) empoderar a los docentes en términos de conocimiento de ECA y capacidad de uso de las TICD; 2) proporcionar un entorno de apoyo y rico en retroalimentación utilizando diferentes TICD; 3) brindar oportunidades para el control y la elección de las TICD por parte de los estudiantes-entrenadores; 4) considerar el conocimiento previo de los estudiantes-entrenadores sobre el contenido del curso y las TICD; 5) incluir diferentes opciones para las TICD en el proceso de enseñanza-aprendizaje; 6) usar las TICD para crear entornos de colaboración y discusión entre el profesor y los estudiantes-tutores; 7) evaluar la efectividad de la tecnología para satisfacer las diversas y emergentes necesidades de los estudiantes-entrenadores.

Conclusiones: Para que las TICD sean una parte integral de los cambios educativos, los profesores deben comprender los principios de la ECA que están integrados en las aplicaciones tecnológicas. Al usar las TICD, los profesores pueden entregar contenido de una manera más flexible, creando entornos en línea centrados en el alumno.

Palabras clave

Aprendizaje; desarrollo de entrenadores; educación física; educación superior.

Introduction

Parallel to the movement toward the professionalization of sport coaching, the number of coach education programs (CEP) offered in the university context has increased in several countries (ICCE, 2016). In the UK, for example, the number of university-based CEP grew from 245 in 2009 to 466 in 2019 (Dray & Howells, 2019). However, coaches have perceived these programs as having little impact on their education (López et al., 2017; Morgan et al., 2013; Turner & Nelson, 2009). This is mainly due to the adoption of traditional, teacher/instructor-centered approaches. In this approach, the student-coaches' previous knowledge is generally disregarded, and the learning experiences are often decontextualized from professional performance (Trudel et al., 2020).

Research has shown that the adoption of a learner-centered teaching approach (LCT) can result in university-based CEP being more meaningful for participating coaches (Salles, 2019; Trudel et al., 2020). The LCT is informed by constructivist learning theory and according to Weimer (2013, p.15):

… is teaching focused on learning—what the students are doing is the central concern of the teacher. Being "focused on learning" is easily understood at a superficial level, but its delineation reveals more details and intricacies: It is teaching that engages students in the hard, messy work of learning; It is teaching that motivates and empowers students by giving them some control over learning processes; It is teaching that encourages collaboration, acknowledging the classroom (be it virtual or real) as a community where everyone shares the learning agenda; It is teaching that promotes students' reflection about what they are learning and how they are learning it; It is teaching that includes explicit learning skills instruction.

Given the priority placed on individuality and contextual learning experiences, LCT seems to address some of the principal criticisms of CEP (Trudel et al., 2020). Research has highlighted that among LCT's potential affordances are the development of individual and social learning skills, autonomy, and creativity (Galatti et al., 2019; Milistetd et al., 2019a). According to Mallett et al. (2013), critical and independent thinking skills, as well as extensive content knowledge, are important requirements for coaching. The authors suggest university-based CEP, especially those designated for high-performance coaches, should incorporate opportunities for collaboration (e.g., discussions), as well as authentic tasks and assessments (e.g., self-evaluation and peer evaluation), which can be applied within their coaching context (e.g., training sessions). In fact, the interactive and reflective strategies characteristic of LCT are valued by coaches when adopted in university-based context (Ciampolini et al., 2019).

Recommendations for CEP began to align with LCT in the last decade (Paquette & Trudel, 2018a; Trudel et al., 2020), particularly with regard to the application of Weimer's framework (2013) in the university (Milistetd et al., 2019b). Milistetd et al. (2019a) and Salles (2019), when implementing Weimer's LCT framework in a university CEP, found that student-coaches were able to broaden their understanding of coaching and perceiving themselves in the coach's role, reinforcing the importance of active teaching strategies and LCT in this context.

In response to the technological evolution in the 21st century, studies about LCT in online learning environments have become more prevalent (Hanewicz et al., 2017; McCombs & Vakili, 2005), alongside the increasing use of Digital Information and Communication Technologies (DICT) in CEP (Dray & Howells, 2019; Stoszkowski et al., 2017). The International Council for Coaching Excellence (ICCE), recognizing the growing value of technology, suggests that technology should enhance the learning experience of coaches, especially in the university context (ICCE, 2016). This can even help high performance coaches to reach international levels (Cifuentes et al., 2022). However, studies that discuss the LCT principles and the use of DICT applied to coach education are still rare (Cushion & Townsend, 2018).

Given this scenario, the purposes of this essay are: (a) to present Learner-Centered Teaching and guidelines for the use of DICT in line with this teaching perspective; and (b) to present and discuss proposals for the use of DICT that can enable learner-centered approach in university-based coach education programs. This essay will therefore include reflections on the implications of LCT and the use of DICT, in order to inform teachers and coach developers with principles and practices to be implemented in CEPs, and better prepare coaches for their role.

Learner-Centered Teaching

Learner-Centered Psychological Principles

According to McCombs (1997), there are 14 principles comprising a knowledge base founded on a learner-centered perspective organized into factors that cannot be ignored in the learning process, as they provide the basis for good teaching practice (see Table 1). These principles guide decisions about content, environment, and learning opportunities, and define a dynamic learning context for continuous improvement. A central understanding is that educational systems must meet the needs of all learners, be focused on the individual, and portray an understanding of the learning process and the essential knowledge and skills to be developed (McCombs, 1997).

Table 1. Learner-centered psychological principles.

COGNITIVE AND METACOGNITIVE FACTORS
Nature of the learning principles. The learning of a complex subject is most effective when it is an intentional process of constructing meaning from information and experience.
Goals of the learning process. The successful learner, over time and with support and instructional guidance, can create meaningful representations of knowledge.
Construction of knowledge. The successful learner can link new information with existing knowledge in meaningful ways.
Strategic thinking. The successful learner can create and use a repertoire of thinking and reasoning strategies to achieve complex learning goals.
Thinking about thinking. Higher order strategies for selecting and monitoring mental operations facilitate creative and critical thinking.
Context of learning. Learning is influenced by environmental factors including culture, technology, and instructional practices. Teachers play an important role in interacting with the student and the learning environment.
MOTIVATIONAL AND AFFECTIVE FACTORS
Motivational and emotional influences on learning. What and how much is learned is influenced by motivation. Motivation to learn, in turn, is influenced by the individual's emotional states, beliefs, interests and goals, and habits of thinking.
Intrinsic motivation to learn. The learner's creativity, higher order thinking, and natural curiosity, contribute to motivation to learn. Intrinsic motivation is stimulated by tasks of optimal novelty and difficulty, relevant to personal interests, and providing for personal choice and control.
Effects of motivation on effort. Acquisition of complex knowledge and skills requires extended learner effort and guided practice. Without learners' motivation to learn, the willingness to exert this effort is unlikely without coercion.
DEVELOPMENTAL AND SOCIAL FACTORS
Developmental influences on learning. There are different opportunities and constraints for learning. Learning is most effective when differential development within and across physical, intellectual, emotional, and social domains is considered.
Social influences on learning. Learning is influenced by social interactions, interpersonal relations, and communication with others.
INDIVIDUAL DIFFERENCES FACTORS
Individual differences in learning. Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity.
Learning and diversity. Learning is most effective when differences in learners' linguistic, cultural, and social backgrounds are taken into account.
Standards and assessment. Setting appropriately high and challenging standards and assessing the learner, as well as learning progress, are integral parts of the learning process.

Source: Authors, based on APA (1997).

Higher education institutions were called upon to adopt LCT in the 21st century (Blumberg, 2009; Cullen et al., 2012; Weimer, 2013), progressing from the Instruction Paradigm, in which the teacher and the instruction are at the centre of the education, to the "Learning Paradigm" (Barr & Tagg, 1995). According to Barr and Tagg (1995), teaching based on the Learning Paradigm is collaborative and cooperative between the teacher and the learner. Here, the teacher is not the sole person responsible for planning, conducting, and evaluating the teaching content and strategies. Rather, these roles are shared with the learner, making the teaching-learning process more meaningful for the learner.

Dimensions of the Learner-Centered Teaching

To support this paradigm shift in higher education, educators and researchers developed theoretical teaching approaches and tools for assessing the status of programs or courses (Cullen et al., 2012; Weimer, 2013). Weimer (2013) discusses the need to decentralize the role of the teacher in education, identifying five dimensions that can guide the process of curricular reorganization based on LCT: the role of the teacher; the balance of power; the function of content; the responsibility for learning; and the purpose and processes of evaluation. Table 2 shows some challenges to be considered, key changes, and implications in practice considering the five dimensions when implementing a LCT.

Table 2. Challenges, key changes and implications in practice regarding Weimer's five. dimensions.

	Challenges	Key changes	Implications
The Role of the Teacher	- Instructional action tend to be focused on teachers; - Teachers see themselves as a lecturer or provider of the knowledge to be transferred to the learners.	- Teacher is a facilitator of learning, responsible for stimulating learners' desire to learn and guide reflective learning from experience, and to develop structure, content and tools that value learning as a lifelong process; - Genuine trust in learners by the facilitator, followed by the creation of an accepting and empathic environment.	- When the teacher says less, learners can make more discoveries; - Development of intellectual maturity and learner' responsibility for learning itself.
The Balance of Power	- Teachers often exercise their control in the classroom by making all or most of the decisions related to learning; - Learners tend to feel comfortable with teachers' control, having experienced more authoritarian education systems in primary and secondary schools.	- The power is gradually shared, considering the autonomy of learners and the confidence of teachers; - Learners' opinions and recommendations are listened to, so teachers share decision-making about learning with learners; - Positive relationships, non-directivity, empathy, cordiality, and encouragement for thinking and learning.	- Teachers control less, learners are more involved; - Learners can feel confident, more open to challenges and motivated to learn.
The Function of Content	- Teachers often strive to teach as much content as possible, to fulfill curriculum requirements and help learners acquire as much knowledge as possible.	- Teachers consider the meaning of the content for the learner, instead of the amount of it; - Teachers help learners develop a knowledge base and learning skills that consider the learners' prior knowledge to assist in solving everyday problem situations.	- Teachers may cover less, but student can learn more; - Meaningful and continuous learning.
The Responsibility for Learning	- Contemporary students come to higher education less confident and with a high level of stress, often being unable to function without structure and imposed control, and with little or no commitment to learning.	- Teachers create a safe learning environment that motivate learners to accept gradually responsibility for learning.	- Development of intellectual maturity, learning skills, and awareness; - Giving learners the opportunity to become independent learners is a necessity, and support may be needed for the development of autonomy and self-direction in learning.
The Purpose and Processes of Evaluation	- The students' biggest concern is to get a good grade.	- Evaluation activities should also be used to promote learning and to develop self- and peer assessment skills.	- Accurate self- and peer assessment results in fewer arguments over grades; - It does not eliminate grades or responsibilities. Rather, provides an opportunity for active learning.

Source: Authors, based on the work of (Blumberg, 2009; Cullen et al., 2012; Hanewicz et al., 2017; Weimer, 2013).

It is worth mentioning that learning is a dynamic, non-linear, and lifelong process (Jarvis, 2009), so learners can move forward and back, being at different levels of autonomy, depending on the issue (Weimer, 2013). Furthermore, the development of autonomy and self-directed learning skills are not an assured outcome of LCT, so it is important that faculty who use these approaches do so in effective ways for students' growth and development as learners (Weimer, 2013).

LCT and the Digital Information and Communication Technologies

With the advancement of technology and the emergence of online education, there is a need to consider the implications of using LCT within digital environments (McCombs & Vakili, 2005). Indeed, in a virtual and face-to-face environment, the engagement of the apprentice with higher education is related to active learning (Meyer, 2014). In LCT' environments, teachers need to promote moments of discovery to students, which lead to active learning (Weimer, 2013). McCombs and Vakili (2005) report a series of practical implications for teachers, principals, and researchers in the field of education when using DICT.

Regarding cognitive and metacognitive factors, McCombs and Vakili (2005) report the importance of planning specific teaching strategies for the virtual environment to support metacognition and the learners' reflection on the learning process. As examples, the use of virtual platforms for dialogue and collaboration between learners, building a continuous basis for discussing problems, participating in projects, creating digital content, developing ways to organize and synthesize information, and evaluate

learning (McCombs & Vakili, 2005). It does not mean that oral exposure is not important, in fact, it may be necessary for the introduction of new concepts (Blumberg, 2009; McQuade; Nash, 2015). In a virtual environment, this moment can be more challenging for the teacher, since it is easier to access different devices that cause distractions. So, interactive strategies should facilitate the connection between the learners' previous knowledge and new knowledge, in both content and the use of technologies, promoting engagement and meaningful learning (Weimer, 2013). Furthermore, it is important to promote digital literacy and strategic thinking through appropriate and diverse electronic sources aligned with the needs and abilities of the students (McCombs & Vakili, 2005).

About motivational and affective factors, it is important to consider that, in online education programs, learners are not necessarily independent, self-disciplined, and self-reliant (McCombs & Vakili, 2005). The teacher may provide support through different channels such as emails, chats, and online mentoring, as well as Socratic questioning, continuous feedback, and guided practice, to encourage learner to become self-directed and motivated. Another important aspect for the development of motivation is to provide opportunities for control and choice by learners, such as the selection of various activities, forms of assessment, content of electronic portfolios, and which specific technologies to use. This should take place in a safe and challenging environment, in which learners feel accepted and encouraged to take risks (McCombs & Vakili, 2005).

Social and development factors involve guidelines for the development of strategies that facilitate interaction and virtual communication between learners and the teacher, in order to reduce the feeling of isolation and generate a sense of community (McCombs & Vakili, 2005). Two-way communication and feedback on learners' expectations of the course are important in this process. When student-coaches receive ongoing feedback, they are more likely to take responsibility for their own learning (Santos et al., 2023a; Santos et al., 2023b). Also, collaboration between the learners, promoting learning from each other, by receiving peer feedback, can contribute (Carl; Strydom, 2017). Finally, by including interactive activities, learners can take on new or non-traditional roles, with new opportunities for dramatization and role-play for conversation and learning. Online games and videoconferencing for individual and group dialogue can assist in this process, with opportunities for learners to build teams, develop electronic personalities, lower fear, and encourage collaboration (McCombs & Vakili, 2005).

Lastly, about the factor of individual differences, McCombs and Vakili (2005) emphasize the importance of diagnostic evaluation of learners' characteristics, behaviors, and skills, in order to plan and provide different ways of electronically displaying materials for different learner needs. Different strategies, such as texts, graphics, audios, videos, or animations, allow learners to take advantage of the non-linear and individualized learning resources of virtual environments. The forms of assessments can also be diversified, along with the availability of feedback and online notes. The ability to provide contextualized and individualized feedback throughout the assessment process can motivate learners and promote meaningful learning (Santos et al., 2023a). When online teaching practices are individualized with principles and practices validated by research, teachers are perceived as learner-centered (Mccombs, 2015).

McCombs and Vakili (2005) emphasize that a primary structure to guide the development of a virtual learning environment would consist of: (a) recognizing the holistic nature of learning as involving the four domains identified in the learner-centered principles; (b) providing strategies that align the characteristics of the technology to the needs of the learners in a non-linear and dynamic learning process; (c) facilitating the development of relationships and communities of learners that support the notion of learning as a partnership between all learners; (d) recognizing that the roles of teacher and learner change dynamically as different levels of knowledge are acquired.

LCT' Five Dimensions and DICT: Propositions for University-based Coach Education

Learner-centered teaching has been recommended for CEP around the world, with the aim of providing opportunities for active learning (Nelson et al., 2013) while valuing the knowledge and experiences of coaches acquired throughout life (Trudel et al., 2013). This would develop more effective programs, including those offered by universities (Milistetd et al., 2019a). Paquette and Trudel (2018b) outlined 10 recommendations to support LCT' in CEP, aiming to assist coach development administrators with

learner-centered program design, facilitation, and coach learner engagement. The authors highlighted the importance of adapting to the objectives and needs of each context by: (a) becoming a learner-centered leader; (b) using a variety of learning strategies to achieve specific results; (c) deliberately developing learning skills; (d) uniting assessment with learning; (e) recruiting facilitators, not instructors; (f) providing learner-centered training for facilitators; (g) regularly assessing the facilitator's performance; (h) helping coaches recognize their learning vision and understand LCT; (i) prioritizing making content meaningful for coaches; and, (j) empowering coaches with increased autonomy and learning options.

Although, the implications of using DICT to make LCT feasible are yet rarely discussed with respect to the university context (Cushion & Townsend, 2018). We therefore suggest seven propositions, aligned with Weimer's (2013) LCT five dimensions, that can be used to guide the mobilization of DICT within a LCT perspective for university-based CEP. article text article text article text article text (Figure 2).

The Role of the Teacher

Proposition 1 - Empower Teachers in Terms of LCT Knowledge and DICT Ability

For technology to be an integral part of educational reforms, the teacher should fundamentally understand how to apply the principles of LCT when using DICT, as well as how to properly use them.

Among the recommendations for coach development administrators is providing training for teachers in terms of learning facilitation (Paquette & Trudel, 2018b), and encouraging them to take on the role of coach developers (Galatti et al., 2019). According to the ICCE (2014), coach developers are "those trained to develop, support and challenge coaches to go on honing and improving their knowledge and skills in order to provide positive and effective sport experiences for all participants" (p. 6). Given the complexity of facilitation, a first step in the training of LCT involves reading and appropriating the principles that underlie LCT (Paquette & Trudel, 2018b). Adopting a LCT perspective involves a change in teaching philosophy (Milistetd et al., 2019b), so training can present some challenges. Culver et al. (2019), found in a training process that the biography and prior knowledge of coach developers influenced how they understood facilitation. Some of them were familiar with LCT and felt comfortable, while others felt challenged as LCT facilitation was very different from the way they were used to teaching.

Another important aspect for training was the need felt by some coach developers to observe another more experienced facilitator in action. Galatti et al. (2019) showed that observation helped in the training process of a newcomer coach developer in a university-based CEP. In addition, sharing their own experiences about facilitation and reflection with peers seemed to be essential for the development of facilitators. In both studies, familiarization with LCT seemed to contribute significantly to the performance of facilitators in LCT programs.

Considering what Weimer (2013) discussed about non-linear changes when assuming a LCT, it is worth mentioning that when teachers take on the role of coach developers as learning facilitators, it does not mean that teachers never instruct nor point out direction. There may be a need for some instructions and the introduction of new knowledge for new learning to mature (McQuade & Nash, 2015).

The ability to effectively use DICT is key to integrating them into LCT. Factors such as the availability of and accessibility to technologies, limited social interaction, and digital fatigue can interfere on the effectiveness of this process (Setiawan, 2024). Teachers' competence and self-efficacy are important to build a positive attitude towards instructional technologies and foster their integration in the educational setting (Seifu, 2020).

Proposition 2 - Provide a Supportive and Feedback-rich Environment using Different DICT

Being available via email, using forums, and engaging in virtual mentoring can enable positive relationships between teachers and student-coaches, as well as timely feedback and on-going learning.

Coach developers in CEP have been described in terms of their potential as motivators of lifelong learning, based on three main mechanisms (Dohme et al., 2019). The first is to make themselves available and accessible, and to provide support, inspiring coaches to continue to refine and improve their knowledge and skills even after completing a CEP. The second mechanism is to create a sense of belonging. Coach developers should mediate a feeling of belonging, establishing positive and lasting

relationships between program participants. The third is to raise the coaches' aspirations, increasing their sense of purpose and duty by explicitly communicating that coaches play a key role in the holistic development of human beings, ultimately affecting their well-being, competence, and skill development for life (Dohme et al., 2019). These multiple functions require coach developers be self-reflective and understand: (a) the context in which coach education occurs; (b) the coaches they are working with; (c) the learning theories of children, adolescents, and adults; (d) training curricula; and (e) innovative educational practices (Abraham et al., 2013).

The Balance of Power

Proposition 3 - Provide Opportunities for Control and Choice of DICT by Student-coaches

As student-coaches become experienced and responsible for the learning process itself, support and activities may become less and less structured. This is a way to develop responsibility for learning, while balancing power.

The literature in coach education highlights that strict guidelines and the lack of opportunities to share decisions tend to decrease autonomy (Paquette et al., 2014) and, consequently, can influence motivational and affective learning factors (APA, 1997). Inflexible structures lead to the belief that there is "a real way to train", limiting the capacity for reflection and individualization of the coach's own journey (Paquette et al., 2014). Therefore, the literature recommends carefully balancing structure and flexibility in the conceptualisation and implementation of the CEP (Paquette & Trudel, 2018b), and considering individual differences (APA, 1997).

According to McCombs and Vakili (2005), it is important that teachers (a) actively involve learners in discussing problems, participating in projects, and responding to activities, (b) provide interactivity that is related to learners' perceptions of quality learning experience and, (c) provide opportunities for control and personal choice in areas such as types of activities. In this sense, to facilitate the balance of power in CEP it is possible to make use of technological tools, providing virtual platforms for interactivity between teacher and learners.

The Function of Content

Proposition 4 - Consider the Student-coaches' Previous Knowledge Regarding the Content of the Course and DICT

When investigating a bachelor's program in Physical Education in Brazil, Milistetd et al. (2018) reported that teachers rarely assess the learners' prior knowledge regarding the content of the course. One exception was reported by Galatti et al. (2019), wherein teachers of a bachelor's degree in sports science planned the contents of a discipline based on the perception of student-coaches about different knowledge and skills of the coach. Thus, the contents of the discipline were designed to meet the specific needs of the learners. Moreover, Milistetd et al. (2019a) used different strategies, such as using training observations and discussions among learners, to encourage them to establish meaningful relationships between the aspects discussed in the classroom and their daily practice as student-coaches.

When using DICT, in addition to identifying the learners' prior knowledge about a specific content, it is equally important to be aware of their prior knowledge and skills regarding technology and the virtual environment (McCombs & Vakili, 2005). Even though new generation students are called as "digital natives", who expect technology to be an integral part of their educational experience, they actually possess a diverse range of skills and preferences regarding DICT (Kennedy et al., 2008, 2010). Teachers should not assume that everyone is equally capable in using technology in the educational environment. When necessary, encourage and support digital literacy. Some of them may have unrestricted access to computers and laptops, while other do not even have access to internet connection, for example (Kennedy et al., 2008).

Prior experiences with DICT are highly related to availability and accessibility conditions. Among the few empirical studies on the use of DICT in university-based CEP, Stoszkowski et al. (2017) found that prior knowledge is crucial in collaborative problem-solving and that students showed little desire to learn how to operate a new digital platform. As Dray and Howells (2019) warn, students tend to engage less on digital platforms for education compared with social media. Therefore, although there is an increase in the use of technology in society, some learners may have difficulties, and/or not engage in

the proposed process. Besides that, students may mastery basic DICT, such as email, virtual classrooms and apps in general, but they feel less competent to use digital tools in the analysis and resolution of real problems (Perea Rodríguez; Abello Avila, 2022). In this sense, encouraging digital literacy with useful tools can improve student-coaches' competence in using DICT.

Proposition 5 – Include Different Options for DICT in the Teaching-learning Process

The use of a DICT should facilitate the connection between previous knowledge and the new knowledge of the student-coaches, with regard to both content and the technology used. What works in one context may not work in another, just as what facilitates one person's learning may not facilitate another's. Thus, having different DICT can augment the chances of meeting the different learning styles and needs of the learners.

Jones et al. (2014) examined the use of video diaries to support the development of empowerment, active voice, and spontaneity; as well as reflection as a way of learning for coaches in university education. The authors found that coaches using video diaries were less reflective compared to those engaged in written records and group discussions. On the other hand, Mead et al. (2016) found the use of the video diary was effective as a self-assessment tool for the continuous learning of elite coaches, emphasizing that assessments should also be contextual. Therefore, teachers have to consider the various cognitive and metacognitive factors, motivational and affective, social and development, and individual differences in a holistic way so that the use of technology helps to make course content meaningful to the learners (McCombs & Vakili, 2005).

Teachers can use synchronous and/or asynchronous communication in terms of technological resources in online education (Almeida, 2003). Asynchronous communication occurs in an unsynchronized manner and therefore does not require the simultaneous presence of participants, neither in space nor in time. Synchronous communication occurs in a synchronized manner, implying the presence of participants in the same virtual space in real time (Moreira & Barros, 2020). The combination of synchronous and asynchronous forms can meet different needs and possibilities, enhancing the achievement of learning objectives (Almeida, 2003).

The Responsibility for Learning

Proposition 6 - Use DICT to Create Environments for Collaboration and Discussion between Teacher and Student-coaches

These environments have the potential to develop reflective thinking as an integral part of the learning process.

Taking responsibility for learning does not occur naturally or easily (English & Kitsantas, 2013). As Weimer (2013) argues, learners have difficulties when educational environments are less structured and controlled. Stoszkowski et al. (2017) found that students in university-based CEP felt a latent desire for direction and guidance, and did not interact with their mentors as this did not count in the final grade. Indeed, completing tests successfully and achieving final marks seem to influence students' behavior (Stoszkowski & McCarthy, 2018). This difficulty to deal with responsibility for learning does not mean that students devaluate autonomy and self-determination in their studies. Stoszkowski and McCarthy (2018) when using a heutagogical approach in two university-based CEP, found that students enjoyed being able to take charge on their studies and see autonomy as a life skill. Thus, the difficulty in dealing with responsibility for learning might be related to their lack of experience with it (Blumberg, 2009), their development regarding dependence in self-direction (Weimer, 2013), their emotional maturity and knowledge and understanding of learning (Mccarthy & Stoszkowski, 2018; Stoszkowski & Collins, 2017). For these reasons, it is important to get to know the student-coaches enrolled in the CEP. Moreover, there is a need to gradually implement strategies for developing responsibility for learning (Salles, 2019). This ability is developed from numerous opportunities to practice self-assessment skills and when students consistently receive formative feedback to help them improve (Blumberg, 2009).

Learning skills are the basis for coaches to become lifelong learners, capable of integrating experiences into their biography in an autonomous and continuous way (Trudel et al., 2016). Among the LCT strategies used to encourage the learning skills of coaches in CEP are reflective practices such as problem-based learning activities (PBL) (Driska & Gould, 2014; Roberts & Ryrie, 2014). PBL encourages

the development of self-directed learning skills (Blumberg, 2009), capable of provoking critical thinking in coaches (Jones & Turner, 2006), as it involves the acquisition of knowledge through the resolution of practical situations. Given the dynamics and complexity of the situations found in coaching (Jones, 2006), it is important to employ LCT strategies, such as PBL, to help coaches become aware of the need to be apprentices throughout life. Project-based learning is also a worthwhile strategy to promote "students' autonomy, constructive investigations, goal-setting, collaboration, communication and reflection within real-world practices" (Kokotsaki et al., 2016, p. 267). These strategies can even be used with the use of technology, allowing learners to assume new or non-traditional roles, with new opportunities for dramatization and role-play in virtual environments (McCombs & Vakili, 2005).

The portfolios has also been used in CEP (Galatti et al., 2019; Paquette et al., 2014), including electronically (Dray & Howells, 2019). It can be considered a strategy for the learner to be involved with the learning process itself, facilitating self-regulation and responsibility for learning, encouraging learners to understand their strengths and weaknesses and to act on them to promote learning (Dray & Howells, 2019). This strategy can contribute to apprentices reaching the next level of development (McCombs & Vakili, 2005).

The Purpose and Processes of Evaluation

Proposition 7 - Evaluate the Effectiveness of Technology to Meet the Diverse and Emerging Needs

It is necessary to find the correspondence between the technology used and the learning principles, but also their alignment with the interests and needs of the learners.

When designing a CEP, Paquette and Trudel (2018b) recommend the use of various assessment strategies, such as debriefs and formative feedback, peer review, and self-assessment. The portfolio, besides facilitating student-coaches' involvement and responsibility for learning, as mentioned above, can also be used as an evaluation process (Dray & Howells, 2019; Galatti et al., 2019; Paquette et al., 2014). The learner demonstrates understanding, shifts in learning and meta-cognition processes in his/her portfolio, so it can be drawn on as a way of promoting individual formative assessment and coursework evaluation (Klenowski et al., 2006). According to McCombs and Vakili (2005), teachers may allow learners to create electronic portfolios and other authentic assessments that define virtual participation. Among the benefits of the electronic portfolio are the level of student involvement with the tool and the ability of the teacher to provide contextualized and individual feedback throughout the assessment process (Dray & Howells, 2019).

When using various forms for assessing, it is important that DICT correspond to the individual needs of the learners. Otherwise, the purpose of evaluation might not be achieved. For example, some DICT can be unintuitive and confusing (Stoszkowski et al., 2017), so student-coaches may not engage in the process. In this way, not only the formative process of evaluation is compromised, but also the learners' learning. Thus, in addition to propositions 2 and 6 of this essay, teachers should consider whether DICT meet learning objectives and are easily accessible and used by learners.

Final Considerations

The recommendations for coach education programs grounded in LCT consider the learner as a protagonist in the learning process, including when the education is mediated by DICT and carried out in virtual environments. For DICT be an integral part of this or other educational changes, teachers must understand LCT principles that are embedded in technology applications. The effective application of DICT, in turn, is related to a teachers' positive attitude towards technologies, which depends on competence and self-efficacy (Seifu, 2020). In addition to the people involved, one of the factors for the successful use of DICT in learning is the construction of a safe and supportive learning environment.

The literature shows that DICT can support learning through collaboration, counterbalancing the potential of technology to cause personal and social isolation and alienation (McCombs & Vakili, 2005). By using DICT, teachers can delivery content in a more flexible way, creating online learner-centered environments. It is the teaching philosophy that will dictate the pedagogical process. The seven

propositions presented in this essay provide a framework for using DICT in a manner aligned with learner-centered principles in university-based CEP. Nevertheless, teachers' reflections about pedagogy, context, and learner characteristics should transcend the propositions outlined.

To conclude, if the studies that discuss the use of DICT to foster learner-centered coach education are still rare, evidence from practical interventions is even more. So, further research should seek to investigate the efficacy and the potential impacts of technologies in learner-centered coach education.

Financing

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