Faculty Teachers' Beliefs and Practices Regarding Digital Technology-Based Generic Skills Development

Crenças e práticas de professores universitários quanto à integração da tecnologia digital para o desenvolvimento de competências genéricas

Creencias y prácticas de docentes universitarios respecto a la integración de tecnología digital para el desarrollo de competencias genéricas

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How to cite: Vera, F. y García-Martínez, S. (2022). Faculty Teachers' Beliefs and Practices Regarding Digital Technology-Based Generic Skills Development. *Revista Colombiana de Educación, I*(84), 1-16. https://doi.org/10.17227/rce.num84-11582.

Fecha de recepción: 10/04/2020
Fecha de evaluación: 01/10/2020

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Abstract

This article seeks to explore teacher beliefs and practices regarding integration of digital technology into the curriculum, under a flipped classroom-based innovation project, at a Chilean private university. It is a virtual ethnography-based qualitative research that allows analyzing the narrative of 45 teachers registered in forums in a virtual environment. Results show that most teachers use PowerPoint presentations and e-mail as technological resources in their practice (84,44% and 77,77%, respectively). As far teaching style is concerned, lecture continues to prevail. As a conclusion, teachers' beliefs are directly related to integrating digital technology into the curriculum.

Keywords

beliefs; learning; skills development; technology; community of practice

Resumo

Este artigo de pesquisa tem como objetivo examinar as crenças e práticas de professores em relação à integração da tecnologia digital para o desenvolvimento de competências genéricas em estudantes de graduação, no contexto de um projeto de inovação curricular, sob o modelo de aula inversa, em uma universidade privada chilena. Para isso, optou-se por uma abordagem qualitativa e etnográfica virtual, analisando-se a narrativa de 45 professores nos fóruns registrados em um ambiente virtual. Os resultados mostram que a maioria dos professores utiliza apresentações em PowerPoint e o correio eletrônico, como recursos tecnológicos em sua prática (84,44% e 77,77%, respectivamente). Quanto ao estilo de ensino, a aula expositiva continua a predominar. A partir desta pesquisa, conclui-se que existe uma relação direta entre as crenças de ensino docente e a integração da tecnologia digital no currículo educacional.

Palavras-chave

crenças; aprendizagem; desenvolvimento de competências; tecnologia; comunidade de prática

Resumen

Este artículo de investigación pretende indagar en las creencias y prácticas del profesorado en torno a la integración de tecnología digital para el desarrollo de competencias genéricas en estudiantes de grado universitario, en el contexto de un proyecto de innovación curricular, bajo el modelo de aula inversa, en una universidad privada chilena. Para ello se optó por un enfoque cualitativo y etnografía virtual, analizándose la narrativa de 45 docentes en los foros registrados en un entorno virtual. Los resultados muestran que la mayoría de docentes utiliza presentaciones PowerPoint y el correo electrónico, como recursos tecnológicos en su praxis (84,44 % y 77,77 %, respectivamente). En cuanto al estilo de enseñanza, sigue predominando la clase expositiva. De esta investigación, se concluye que existe una relación directa entre las creencias docentes y la integración de tecnología digital en el currículo educativo.

Palabras clave

creencias; aprendizaje; desarrollo de competencias; tecnología; comunidad de práctica

Introduction

Undoubtedly, digital technology has become a powerful tool for addressing various societal issues, bringing about changes in economic, labor, production, scientific, or educational approaches. Technology has gradually been solving society's problems, developing in conjunction with it. However, in the educational realm, this topic is generally associated with the beliefs of those who teach and its impact on the tasks and performance of those who learn (Ertmer, 2005; Ertmer and Ottenbreit-Leftwich, 2010).

So, in light of this new worldview, how do our pedagogical beliefs impact the need to integrate digital technology into the curriculum? Regarding this, most research indicates that teachers' beliefs and practices significantly impact the integration of technological innovations in the classroom (Ertmer, 2005; Hermans et al., 2008). However, the scenario is diverse. Some teachers quickly adapt to technology, and others resist it. It is not just about integrating technology into the curriculum but primarily about transforming teaching practices. In this context, the present study aims to examine teachers' beliefs and practices regarding integrating technology to develop generic competencies in university students under the flipped classroom model within the framework of a curricular innovation project at a private Chilean university.

Integration of Technology in the Curriculum

Technology integration refers to using digital tools to expand, extend, and enrich learning (Harmes, Welsh, and Winkelman, 2016). Various studies have indicated that this approach brings significant benefits to students. For example, it fosters learning motivation and develops generic competencies such as motivation, problem-solving, self-regulation, and technological proficiency (Baek et al., 2008; Ottenbreit-Leftwich et al., 2010; Koc, 2013).

Thus, to successfully integrate digital technology into the curriculum, it is necessary to implement a cross-cutting approach in all disciplines of a program, as the idea of developing technological competencies as a separate course seems misguided (Vrasidas and McIsaac, 2001). In this sense, the preparation of teaching staff in digital literacy should be accompanied by methodologies that allow for the construction, representation, and sharing of knowledge in authentic real-life contexts.

Evidence shows that the effective integration of technology depends on who applies it, who uses it, and for what purpose it is implemented in the curriculum (Burbules and Callister, 2000). In other words, the mere integration of technology does not guarantee a profound attitudinal change in either of the involved agents (teachers and students). Simply training teaching staff in new technologies is not enough (Inan and Lowther, 2010).

It is necessary to equip them with good methodological practices regarding the integration of digital technology to achieve education in line with the new times.

The years of teaching experience alone are insufficient, as it has been demonstrated that those with more experience are less willing to integrate technology than those new to teaching (Inan and Lower, 2010). In any case, evidence also indicates that the use of technology in the educational process is primarily oriented towards low-level cognitive tasks, such as word processing and internet searching (Vannatta and Fordham, 2004). These uses are typically associated with teacher-centered instructional approaches, while high-level cognitive activities are related to learner-centered instructional approaches (Ertmer, 2005).

As we can see, in this new digital era, education faces enormous challenges, transitioning from traditional to innovative forms of learning. Indeed, this demands transforming the teacher's role from a transmitter to a facilitator or knowledge delegator (Zhu, 2010). The decision to integrate technology into the curriculum is often personal rather than corporate (Ertmer and Ottenbreit-Leftwich, 2010). Teachers are exploring possibilities for incorporating new technologies into the curriculum (Inan and Lowther, 2010). Therefore, stepping out of our comfort zone and adopting technologies and teaching/learning methodologies that best fit our practices and educational context is critical.

Empirically, it has been found that those who apply more constructivist learning approaches more easily integrate technology into their classroom proposals (Hermans et al., 2008). This is common in our practice: motivated teachers who emphasize the self-learning process based on technology and highlight sharing these learnings through cooperative activities in the group setting (classroom context).

Teacher Beliefs and Their Effect on Praxis

Generally, we conceive teacher beliefs as a tacit set of assumptions, often unconscious, about education and formative processes such as teaching, learning, and technology integration. We become aware of our peers' beliefs by analyzing their narratives and praxis. Indeed, teacher beliefs are considered the most critical factor in integrating technology into the curriculum (Niederhauser and Stoddart, 2001; Ertmer, 2005).

Commonly, we say that beliefs guide our interactions and interpretations of the world. The same can be told about teacher beliefs and their impact on formative processes. Evidence shows that those who strongly believe that the best way to learn content is through lectures will pay little attention to integrating technology into their praxis (Niederhauser

and Stoddart, 2001; Ertmer, 2005). Furthermore, evidence indicates that teacher beliefs directly relate to methodological decisions in the group setting (Ravitz and Becker, 2000; Ottenbreit-Leftwich et al., 2010; Deng et al., 2014). Additionally, those who focus their teaching on learners often integrate more technology into the classroom than those with more transmissive approaches (Ertmer, 2005; Wozney et al., 2006; Lawless and Pellegrino, 2007; Van Driel et al., 2014).

So, if the new generations of students are much more technological, what adaptations should teachers make to drive this change? There are many curricular adaptations, the main one being how to conceive teaching and learning in the 21st century. Indeed, this new scenario requires teachers capable of shaping a more active and self-managed generation of students (Vera, 2016b; Kadiyono and Hafiar, 2017).

Now, it is enough to observe some classes to confirm that most microimplementation teaching practices (classroom context) are expository, directive, and monological, with solid support from PowerPoint presentations because teachers believe it is the best method to convey knowledge (Rayens and Elli, 2018). Indeed, the lecture remains the primary transmissive method in higher education (Schmidt et al., 2015; Vera, 2016a; Vera, 2016b). This stance only reinforces the idea that there are still specific digital gaps in the teaching sector, making integrating technology into the curriculum challenging. Conversely, some believe in it as a driver of effective formative processes and confidently incorporate it into their praxis (Wozney et al., 2006).

As we can see, in this new digital era, education faces significant challenges ranging from traditional to innovative forms of learning. This new scenario obliges us to examine our pedagogical practices and scrutinize the best practices of our peers with the idea of integrating them into our teaching (benchmarking). The concern is that while we spend much time reflecting on our praxis in teaching meetings, we observe little progress regarding transformative change toward 21st-century education.

Communities of Practice (CoP) for Teachers

In recent literature, a CoP is a virtual environment enabled on a learning platform that acts as a learning management system (LMS), where professionals from various fields seek to develop relationships, improve their practice, share experiences and resources, carry out joint projects, and create new knowledge (Wenger-Trayner and Wenger-Trayner, 2015; Patton and Parker, 2017). Individuals and organizations from various industry sectors increasingly implement these virtual spaces to enhance their performance.

In the educational realm, this virtual environment offers enormous opportunities for the professional development of teachers. A CoP facilitates peer learning by allowing engagement in various activities and engaging in discussions on disciplinary topics (Patton and Parker, 2017). Thus, to achieve comprehensive organizational learning, its members must intentionally and continuously share ideas, approaches, and resources (Figure 1). It is common for teaching teams working in a CoP to build close relationships and take joint responsibilities in an informal context (Ali, 2011; Quennerstedt and Maivorsdotter, 2017).

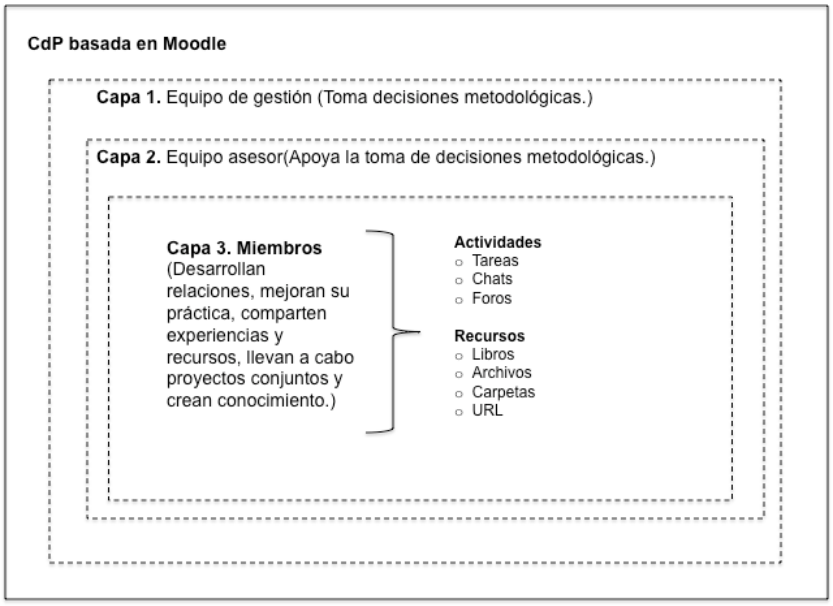

Figure 1.

CoP in three layers based on Moodle

Source: Own elaboration.

A CoP generally comprises the following elements:

» *Shared domain:* Members share resources, experiences, goals, and issues, focusing on a common theme.

» *Management team:* Professionals, men and women, experts in their disciplinary area who manage agreements and provide expert advice.

» *Members:* Professional individuals willing to share, learn, and collaborate for the network's informal growth.

» *Resource/activity area:* Various resources and activities are shared to achieve common objectives.

As noted, a CoP strengthens when its members share information and experiences/aspects that enable personal and professional growth. To better utilize this virtual space for teachers, the following questions are proposed:

- What are the objectives of a CoP?
- How can collaborative learning be promoted among its members?
- What types of activities generate greater synergy among its members?
- How should the members communicate to achieve the objectives of a CoP?
- What interactions should occur in a CoP to engage its members?
- How can the members collaborate to achieve the objectives of a CoP?

The exciting aspect of participating in a CoP focused on leveraging the integration of digital technology in the curriculum is that the teaching staff learns to master the competencies they will later develop in their students (Patton and Parker, 2017). Therefore, it is an informal space conducive to learning from best practices and improving performance, both individually and organizationally (a sort of internal benchmarking).

Methodology

The present study was conducted from an eminently qualitative approach, employing methods of virtual ethnography, a qualitative methodology currently used to describe phenomena, social practices, and behaviors of individuals in a virtual environment (Domínguez-Figaredo, 2007; Angelone, 2018). Considering the objective of this study, we chose to analyze the pedagogical narrative of a private Chilean university's faculty regarding integrating digital technology into the curriculum. The narratives were recorded on a digital platform based on Moodle, acting as a Community of Practice (CoP). The teaching staff uses this virtual space to share experiences related to developing and infusing generic competencies into the curriculum of degree programs. Additionally, we reviewed the available resources in this community that the faculty accessed most frequently.

Research Objectives

The general objective aims to investigate the beliefs and practices of the faculty regarding the integration of digital technology for the development of generic competencies under the flipped classroom model in the context of a curricular innovation project at a private Chilean university. Thus, the main research questions are:

1. How do teachers' beliefs influence integrating digital technology into the educational curriculum?
2. What teaching practices drive the integration of digital technology for the development of generic competencies?

Specifically, we analyzed the beliefs and teaching practices revealed in the textual messages recorded in the forums of a Moodle-based CoP. Additionally, we reviewed the available resources on this platform that the teachers visited most frequently. In Table 1, we summarize the selected dimensions of analysis, their description, and the critical aspects that constitute them.

Table 1.

Dimensions of Analysis

Dimensions	Description
Teachers' Beliefs About Their Practices	This dimension explores the teacher narratives recorded in the forums on the CoP platform, where the teaching staff expresses their beliefs about the learning/teaching process and the methods and styles of teaching that drive their practices.
Use of Digital Technology	This dimension explores the various resources for teaching management that faculty members use most frequently on the CoP platform, including preferred digital tools for communication with their students.

Source: own elaboration.

Participants

For this study, we considered the entire teaching population that makes up the formative team[3] of a Chilean private university (N = 45), consisting of 30 women and 15 men (66.7% and 33.3%, respectively), as shown in Table 2. It is important to note that this study was conducted during the full implementation of a curricular innovation project based on the flipped classroom model.

3 Cross-cutting line aimed at developing and instilling generic competencies in the curriculum, including effective communication, leadership, teamwork, and problem-solving.

Table 2.

Demographic Data of Participants

		N	%
Gender	Masculine	15	33,33
	Feminine	30	66,77
Age	28-30	2	4,44
	31-36	7	15,55
	37-40	22	48,88
	Above 40	14	31,11
Academic background	Bachelor	6	13,33
	Magister	39	86,66

Results

For the content analysis of the forums, it was decided to determine themes and dimensions not previously identified to deeply understand the teachers' narratives. This process involved four stages: data coding, identification of themes, and definition of findings and interpretation (Yildirim and Simsek, 2008). The findings and themes that emerged in the forums are presented in frequency and percentage.

Teachers' Beliefs about Their Practices

One-third of the teaching staff (33.33%) believes that the expository teaching style or a teacher-centered approach is still completely valid as a strategy for acquiring new student content (Table 3). This practice contradicts the ongoing curricular innovation project at the studied university, in which theoretical contents were migrated to the virtual classroom, focusing on self-learning and self-regulation of the learners. There is also no apparent need among the teaching staff to motivate their students to enter the virtual classroom and explore autonomously the range of activities and resources for learning made available there.

Table 3.

Teaching Styles

Teaching Styles	*n*	%
Expository approach	32	71,11
Participatory approach	10	28,88

Source: own elaboration.

Regarding teaching styles, the faculty expresses the following opinions:

> As I noticed that the students had not reviewed the contents of the virtual classroom, I had to explain several concepts before conducting practical activities. I think this is more effective than referring them to the virtual classroom, which I am sure they will not review. (Participant 25)

> I must admit that we have to visit both the virtual classroom [individual space] and this community [CP] to be more in tune. I think we need more support among ourselves here. (Participant 7)

> In my case, I asked them to organize into groups of 3 to 5 students and helped them choose a leader because they still struggle to organize themselves [practical activity in the physical classroom]. (Participant 12)

> Regardless of the content available in the virtual classroom, I believe we cannot overlook reviewing the previous class. (Participant 42)

> I am using practical activities from other courses. Sometimes, I don't have time to download those available here [CP]. (Participant 38)

> For me, the most important thing is that my students understand everything. A good explanation is enough. (Participant 43)

> As the topic was somewhat more complex [covered in the virtual classroom], I did a brief summary of the previous class. I believe we cannot underestimate this practice. (Participant 35)

Use of Digital Technology

Almost all faculty members (84.44%) mention working with PowerPoint presentations in their classes, making this technological resource the most widely used for educational purposes (Table 4). This practice could indicate the prevalence of the expository teaching approach in most of the faculty proposals studied.

Table 4.

Technological Tools Used in Teaching Practice

Technological Tools	*n*	%
PowerPoint	38	84,44
Internet	26	57,77
Virtual Classroom	23	51,11
Blog	4	8,88
Digital Capsule (micro-video)	3	6,66
Kahoot	2	4,44

Source: own elaboration.

Thus, some participants summarized the use of technology as follows:

> To present theoretical content, I usually find a PowerPoint presentation more effective, which we discuss in class with my students. Then, I send them to their emails. This way, I ensure that they pay more attention to the class. (Participant 6)

> The students are accustomed to PowerPoint presentations. If one does not use them, they interpret it as if we didn't have a class. (Participant 39)

> […] In any case, my presentations are brief. I only include what is necessary. I also include some infographics to clarify certain concepts. (Participant 15)

> Colleagues, I recommend using Kahoot, which we learned in Saturday's workshop. It worked for me to assess the declarative part [self-learning phase in the virtual classroom]. (Participant 21)

> I asked the students to develop their portfolios in a blog. It didn't cost them much. In any case, I was forced to build my own. I don't even have a personal website. (Participant 36)

> It took me time to record my first digital capsule. But, basically, because I made mistakes. In any case, it's already uploaded to the virtual classroom. (Participant 10)

Most of this teaching staff continues to communicate with their students through email, underutilizing the virtual classroom as a core component of the flipped classroom method in the ongoing curriculum innovation project (Table 5). In this virtual space, a series of activities and resources for learning have been hosted (folders with various study documents, videos, self-learning guides, *ad hoc* tutorials, forums, links of interest, etc.).

Table 5.

Technological Tools Used by Teachers to Communicate with Students

Technological Tools	*n*	%
Email	35	77,77
Virtual classroom	10	22,22

Source: own elaboration.

Regarding the digital technology used to communicate with their students, the teaching staff expresses some of the following opinions:

> In my case, I sent my students the induction process presentation [available in the virtual classroom] directly to their emails. (Participant 27)

> Finally, I inform you that regarding the virtual portfolio, I sent emails with tutorials to support the creation of the requested blogs. (Participant 32)

> Because of the leadership manual, I asked my students to access the virtual classroom [student workspace]. (Participant 43)
>
> It has taken me time to get used to the virtual classroom. Maybe it's easier for the students. (Participant 38)

Resource Review

Additionally, the resources available in the CP platform that teaching staff visits most frequently were reviewed, finding that most (86.66%) visit the folder of practical activities to enhance cooperative learning, including case studies, role-playing, and serious games (Table 6). However, in this same space, other resources, such as videos and methodological suggestions for better teaching, are shared to promote sound teaching practices. Additionally, there is a space to collaborate on cooperative learning activities to enhance the active experimentation phase of the curriculum innovation project, which takes place in the physical classroom (group space).

Table 6

Accessed resources by teachers in the CoP

	n	**%**
Folder of practical activities	39	86,66
Self-learning videos	19	42,22
Tips for good teaching	9	20,00
Teamwork	4	8,88

Source: own elaboration.

Conclusions

In general, the beliefs of the teaching staff about their practices are significantly linked to integrating digital technology into the curriculum. Illustratively, in this study, we observed difficulties in utilizing various resources for cooperative learning available in CP for face-to-face classes (group space) in the ongoing flipped classroom project.

In several cases, the teaching staff applied strategies to address the flipped classroom project's challenge, underutilizing the guidelines implemented as curricular innovation. The teaching staff sometimes struggled to connect the virtual classroom resources (individual space) with practical activities (group space).

Additionally, we observed that the examined teaching staff primarily relies on email to communicate with their students, underutilizing the resources available in the virtual classroom (internal messaging, global messages, and forums). As a result, this practice does not encourage students to access their virtual space – a core component of the ongoing curricular innovation.

We have also found that the examined teaching staff generally does not use cooperative learning activities available in CP for the physical class (group space). On the contrary, the teaching team responsible for the generic competencies training line persists in using other activities. Additionally, very few practical activities designed by the teaching staff for the group space are received in that community. Everything indicates that the interactive, learner-centered approach demands significant planning work, which could demotivate teaching teams.

Regarding integrating digital technology into the curriculum, the only certainty is that it will continue its exponential increase, and the teaching staff will be forced to experiment with new digital technologies and more cooperative methodological strategies. Understanding that part of the teaching staff studied was more open to change is essential. At the same time, another sector, due to its pedagogical beliefs, acted with greater caution or resistance to technological innovation.

On the other hand, although operational conditions were institutionally established for the successful integration of digital technology into the curriculum, including participation in CP, access to various technological resources of Web 2.0, training for the teaching staff, and policies for the use of technology in the classroom, the effective implementation of technology in activities of higher-order cognitive levels was surprisingly low. Thus, the total integration of technology into the curriculum appears to be a distant goal in this group of teachers unless their beliefs and practices are reconciled with digital technology. Moreover, as teachers must dedicate extra hours to learning new technologies and methodological strategies shared in CP, their motivations seem to decrease.

In practice, the pedagogical beliefs of the teaching staff are reflected in the low integration of digital technology they perform in the learning/teaching process. Consequently, we cannot underestimate these beliefs. If we want to integrate digital technology into the curriculum, we must do it with teaching teams. It is also necessary to find ways to encourage teaching teams to modify their methods and practices and make them see that technology can facilitate and even mediate effective learning/teaching processes.

In summary, in any process of integrating digital technology into the curriculum, it is necessary to consider the teacher as a potential driver or inhibitor of any curricular change or innovation. The new digital competencies

include both integrating agents (teachers and students). Therefore, it is imperative that, as educators, we help our peers understand that digital technology is here to stay and needs to be integrated into our practices. Furthermore, today, we are training professionals who will undoubtedly need to deploy various generic competencies (instrumental, interpersonal, and systemic) to interact effectively in the new work ecosystems they will face.

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