



LEARNING CHANNELS AND KNOWLEDGE MANAGEMENT TOOLS AND PRACTICES IN VOCATIONAL TRAINING

CANAIS DE APRENDIZAGEM E AS FERRAMENTAS E PRÁTICAS DA GESTÃO DO
CONHECIMENTO NA FORMAÇÃO PROFISSIONAL

CANALES DE APRENDIZAJE Y HERRAMIENTAS Y PRÁCTICAS DE LA GESTIÓN DEL
CONOCIMIENTO EN LA FORMACIÓN PROFESIONAL

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ABSTRACT

Objective: This research aims to identify the channels of learning in a group of academics from the Pedagogy course.

Methodological procedures: To conduct this study, an exploratory research was carried out in the case study format with data collection through a questionnaire with 20 questions that were answered by all students in the class, corresponding to 18 participants.

Results: The results showed that most students are synesthetic and learn better if the strategy adopted by the teacher involves dynamic interactions and practical activities.

Benefits: In this way, it is understood that the tools and practices of Knowledge Management have a lot to offer teachers in view of their demands in the classroom, as well as academics can benefit when their learning channels are considered in conducting the teaching and learning process, which contributes to the formation of competent professionals who perform the profession with excellence.

Keyword: Tools and practices; kinesthesia; perception; teachers; students.

RESUMO

Objetivo: Esta pesquisa tem como objetivo o de identificar os canais de aprendizagem em um grupo de acadêmicos do curso de Pedagogia.

Procedimentos metodológicos: Para a condução deste estudo realizou-se uma pesquisa exploratória no formato de estudo de caso com coleta de dados por meio de um questionário com 20 questões que foram respondidas por todos os acadêmicos da turma o que corresponde a 18 participantes.

Resultados: Os resultados mostraram que a maioria dos acadêmicos é sinestésica e aprende melhor se a estratégia adotada pelo professor, envolver dinâmicas, interações e atividades práticas.

Benefícios: Desta forma, entende-se que as ferramentas e práticas da Gestão do Conhecimento muito têm a oferecer aos professores diante de suas demandas em sala de aula assim como os acadêmicos podem ser beneficiados quando seus canais de aprendizagem são considerados na condução do processo de ensino e aprendizagem, o que contribui para a formação de profissionais competentes e que executem o exercício da profissão com excelência.

Palavras-chave: Ferramentas e práticas; cinestesia; percepção; professores; alunos.

RESUMEN

Objetivo: Esta investigación tiene como objetivo identificar los canales de aprendizaje en un grupo de académicos del curso de Pedagogía.

Procedimientos metodológicos: Para la realización de este estudio se realizó una investigación exploratoria en formato de estudio de caso con recolección de datos a través de un cuestionario con 20 preguntas que fueron respondidas por todos los estudiantes de la clase, correspondientes a 18 participantes.

Resultados: Los resultados mostraron que la mayoría de los estudiantes son sinestésicos y aprenden mejor si la estrategia adoptada por el docente involucra dinámicas, interacciones y actividades prácticas.

Beneficios: De esta manera, se entiende que las herramientas y prácticas de Gestión del Conocimiento tienen mucho que ofrecer a los docentes ante sus demandas en el aula, así como los académicos pueden beneficiarse cuando se consideran sus canales de aprendizaje en la conducción de la enseñanza y el aprendizaje. proceso, que contribuya a la formación de profesionales competentes que ejerzan la profesión con excelencia.

Palabras clave: Herramientas y prácticas; kinestesia; percepción; docentes; alumnos.

1 INTRODUCTION

Knowledge is an essential resource for education, business, and industrial organizations. Learning increases personal knowledge in which the individual's repertoire of skills increases, expanding the established cognitive structures (Illeris, 2018). Regardless of the organizational context, knowledge becomes active when the organization provides an environment that favors and motivates interactions among individuals (Becerra-Fernandez & Sabherwal, 2010). Each individual has a particular mindset and channels of sensory perception that differentiate him or her from the other members of a team, department, classroom, or group. Therefore, identifying what those channels are, and how they contribute to the learning processes, can help organizations conduct their proposed activities. Muhlbeier and Mozzaquatro (2011) point out that knowing the learning styles of a group allows the pedagogical practice to reach everyone.

Knowledge Management has evolved in recent decades, gaining ground in different areas, helping organizations to achieve results and providing ways of transferring, disseminating, and sharing knowledge and information (Gonzalez & Martins, 2017). In this sense, organizations adopt Knowledge Management to transform themselves into places where encourage learning, creativity and knowledge sharing are encouraged, especially in private organizations, where there is a constant challenge to generate new services and products, driven by market competitiveness (Rodrigues et al., 2010, Semidão 2014).

One type of organization is the school, which can take advantage of Knowledge Management to improve their performance as social institutions. Although Knowledge Management tools and practices are commonly used in the business and industrial areas, these resources can also be useful in the school environment (Aquinord & Araujo, 2013).

The school is organized in a way that aims to achieve its goals, such as quality of learning. Thus, like other types of organizations, schools also have an infrastructure comprised of people, processes, regulations, and goals, among other components (Libâneo, 2013). In the educational environment, Knowledge Management tools and practices can contribute to the expansion of knowledge (Escrivão & Nagano, 2018). Therefore, we must consider the profile of those involved and their learning styles.

In the context of Knowledge Management in schools, this paper seeks to identify different channels of sensory perception capable of promoting learning among undergraduate students. Based on the results, we present a set of Knowledge Management tools and practices to be adopted by schools that can support different learning styles. First, we conducted an exploratory and bibliographic study using the mixed methods approach, i.e., qualitative and quantitative (Creswell & Clark, 2013), to identify different channels of sensory perception used to promote learning. Data were collected in May 2019, through a questionnaire with twenty objective questions. The results showed that 52% of the participants are kinesthetic learning-oriented, which reflects a tendency to learn a topic through practical application.

Moreover, we found out that 25% of the participants are aural learning-oriented, and 23% of them are visual learning-oriented. Based on these results, Knowledge Management practices and tools can be used to accelerate the speed of knowledge sharing in the classroom and among the students. This study is therefore relevant in that it identifies students' channels of sensory perception and the knowledge management tools and practices that might support those learning channels.

Although the group of students included in this study is small, we hope it will prompt future works to investigate further Knowledge Management practices and tools as resources to facilitate learning, providing a process that can consolidate students' knowledge.

2 LEARNING CHANNELS

According to Choo (2003), the school is considered the first or primary source of knowledge for students, and each individual, depending on their particular skills and motivating aspects, has their own particular way of learning. Learning is defined "[...] as a process in which the person "appropriates" specific knowledge, skills, strategies, attitudes, values, beliefs or information, making it their own. (Nunes & Silveira, 2015, p. 10). Regarding the understanding of what will become knowledge, for Piaget (1976), it is the result of the elaborations that happen based on new experiences, and learning is different from one individual to another.

Onuchic & Allevato (2004) argue that learning is a continuous process that takes place in a wide range of different contexts or situations, whether formal or informal, planned or spontaneous. Meanwhile, Piletti (2013) highlights that learning is inherent to human beings, regardless of age, sex, ethnicity, socioeconomic situation, belief, or ideology. The learning process may include aspects such as pace, speed, materials, methods, personal conditions, learning context, intentions, objectives, motivations, and interests.

The process of acquiring knowledge involves different characteristics, such as the acquisition and modification of knowledge, skills, strategies, beliefs, attitudes, and behaviors, Dias (2012). The learning itself, as a subjective element, is composed of skills and competencies, the use of technologies, ways of building knowledge, and multiculturalism (Barros, 2007).

Ferreira (2014) views learning as the construction of knowledge using personalized strategies, as well as the observation of learning styles of each individual, considering their perspective.

According to Dalkir (2017), with each learning process, the individual attributes new meanings to the knowledge that he encounters, during his experience of daily life. For Bazán-Ramírez, Padilla & Simons (2019), knowing the student's level of learning can help the teacher to use appropriate strategies for presenting new knowledge. In this sense, Fleming (2001) developed the technique of mapping learning styles, called VARK (Visual, Aural, Read/Write, and Kinesthetic).

There are different ways to characterize individual learning. Fleming (2001) presents four learning channels: visual, aural, reading/writing, and kinesthetic. Table 2 shows the characteristics of each of these learning channels.

Table 1

Characteristics of learning channels

Channel	Characteristic
VISUAL	The individual prefers to receive information that is presented through visual demonstrations. They find it easier to learn using lists or illustrations; they can remember people's faces easily.
AURAL	The individual prefers to participate in discussions and dialogues, as they learn by listening. They can adapt better to the guidance that is given verbally. Individuals with this profile are easily distracted by sounds.
READ/WRITE	The individual likes to learn by taking notes, or through graphical representations. In lectures, they usually take notes to help them remember what they have been taught.
KINESTHETIC	The individual prefers to learn through practical tasks, i.e., through direct experience; they learn by interacting and experiencing.

Source: Romo, López & López (2005), Borracci et al. (2005), Diaz-Veliz et al. (2009), Mc Coll (2009).

According to Lopes and Morais (2016), there is a wide variety of learning styles and models that have attracted the attention of educators. These models are used to support the planning of pedagogical actions. Moreover, the models represent the relationship between 'those who teach' and 'those who learn.'

According to Cerqueira (2000, p. 36), a learning style is how "[...] an individual manifests himself when confronted with a specific learning task". By identifying or knowing the student's learning style, the teacher (in this case) can use this information to guide strategies and tools that will facilitate learning (Muhlbeier & Mozzaquatro, 2011). Depending on the individual's profile and level of maturity, the learning style may change over time. Individuals achieve the best results when they are allowed to adopt their preferred learning style (Jacobsohn, 2003).

3. KNOWLEDGE MANAGEMENT TOOLS

Knowledge Management has become essential in recent decades, particularly due to the economic crises experienced in the historical process, making an organization effective and efficient, capable of capturing, structuring, and disseminating knowledge (Dalkir, 2017). Thus, knowledge has become a source of competitive advantage for organizations, due to its great potential (Lin, 2014).

Knowledge Management is one of the ways to deal with this organizational knowledge. For Ziviani et al. (2019), Knowledge Management involves organizing people in a way that mobilizes and externalizes their experiences, then disseminating and sharing their knowledge. According to Schiuma, Carlucci, and Lerro (2013), organizations try to manage their knowledge in the most effective way possible in order to stand out in their market, improve their performance, maximize business opportunities and minimize lost opportunities, thereby gaining competitive advantages.

Knowledge Management contributes significantly to managing organizational knowledge and helping organizations to maximize their profit, competitive advantage, and sustainability in the market in which they operate.

Knowledge is the leading competitive factor for preserving an organization. This fact has been recognized in recent decades. But methods for managing an organization’s information and knowledge are needed (Rodrigues, 2013).

Correa et al. (2017) highlight that Knowledge Management leverages and reuses the organization’s existing resources in order to help people find better ways of dealing with knowledge. One way this can be done is through the use of Knowledge Management tools aimed at retaining protected knowledge and making it accessible in the organization.

Knowledge Management tools and practices can be arranged in three categories: human resources, organizational processes, and the technological and functional base (Dalkir, 2017). Practices or tools related to human resources are used to transfer, share, and disseminate knowledge. The tools or practices aimed at structuring organizational processes are used to generate, disseminate, and retain knowledge. The technological and functional base, meanwhile, is used to automate the information management, supporting organizational Knowledge Management with information technology (IT), through the dissemination and collaboration of knowledge.

For a better understanding of this subject, and based on the contributions of Batista (2012), Table 2 shows the three bases of knowledge management tools and practices, together with their goals, and some examples of how these tools can be used to promote the necessary skills to achieve the best performance in the development of the activities.

Table 2
Basis of Knowledge Management tools and practices

Basis	Goals	Tools
Human Resource Management	Provide support to the manager during teams’ formation that is fully engaged, and motivated to learn, create, and share knowledge.	Narratives; Corporative Education; Forums/discussion list; Mentoring; Coaching; Corporate University; practical community.
Structuring organizational processes	Promote the organization, retention, and sharing of knowledge.	Benchmarking; Best practices; Organizational memory; Organizational intelligence; Knowledge mapping; Competency-based management; Organizational competence bank; Individual skills bank; Intellectual capital management; Organizational memory
Technological and functional basis	Supports knowledge management through information technology resources, facilitating storage and sharing.	Portals/intranets/extranets; Workflow system; Content management; Electronic document management; Data Warehouse; Decision support systems; Balanced scorecard; Data mining; Customer relationship Management; Key performance indicators; Enterprise source planning.

Source: Adapted from Batista (2012)

According to Batista (2012), Knowledge Management practices and tools can help an organization to outline strategies that will enable it to gain spaces in which learning, creation, and knowledge sharing can be encouraged; but having knowledge alone cannot bring benefits (Strauhs et al., 2012); it must be linked with a context that involves people, physical structure, investments, leadership, and skills whether intellectual capital is to be produced. In a school organization, the knowledge must be socialized and systematized strategically, to avoid the nucleated concentration of information.

Learning in the school environment occurs systemically and intentionally. It is designed, organized, and executed according to a framework of purposes that characterize the pedagogical work. Using the framework techniques is not a simple process, as teachers must think about the learning channels of individuals within the school organization. The

teachers also need to consider the potential and limitations. Thus the concern with quality training is evident. The expectations around the quality of training are related to the way people are trained by competent and ethical professionals, where the teacher is concerned to provide good quality training for those under his responsibility (Motta, 2019).

Lück (2009) presents a list of dimensions that converge and support new challenges in terms of learning, as well as demands assigned to the school. These dimensions relate to the pedagogical project, physical and structure, as well as the school management, the community, and education policy. For Aquinord & Araujo (2013), education occurs in the school space in a complex way, intertwined with a set of variables and social agents that can reflect on the quality of learning (Leal & Albertin, 2015).

In this context, Knowledge Management considers people's engagement to disseminate their knowledge (whether tacit or implicit). This knowledge, when incorporated by the organization, results in new knowledge (Nonaka & Takeuchi, 2008). Given the possibilities of knowledge management tools, these tools can provide the teacher and students with different possibilities for reaching everyone within the classroom. The job of Education is to consider each individual, and not only the class or group. Regardless of whether the teaching is at a basic or higher level, students should be prepared for life, with the ability to use the skills acquired through consolidated knowledge.

4 RESEARCH METHOD

This work comprises exploratory, bibliographic, and field research, using a mixed-methods approach that combines both qualitative and quantitative elements to explore the subject. This provides a comprehensive characterization of the investigation and a better understanding of the results (Creswell & Clark, 2013). For further study on the subject, we searched for publications on the subject in scientific databases such as the CAPES Journal Portal, Science Direct, Emerald Insight, and Google Scholar. We used the following Search terms in Portuguese: 'aprendizado e gestão do conhecimento'; 'formas de aprendizado', and in English; 'learning and knowledge management' and 'means of learning'.

Although we found a considerable number of studies related to learning, knowledge management, and forms of learning, we found very little about forms of learning and knowledge management in the educational context. This lack of studies on the subject suggests that further studies are required.

We performed the data collection in three steps. First, the researcher explained the study topic to the participants, and how the channels of human perception function. Second, all eighteen participants – aged between 20 and 38 years in the seventh semester of the pedagogy course at a University in the northwestern region of Paraná – received the questionnaire containing twenty questions, and were asked to give one of three alternative responses to each question. The questionnaire was based on Fleming (2001) and was configured as the VARK (Visual, Aural-Read, Write, and Kinesthetic) learning style mapping technique, the purpose of which was to identify the channels of sensory perception and the learning style of each participant. The questionnaire aimed to investigate the participants' preferences for a particular activity, i.e. practical application, or simply observing or hearing about the research object. Finally, the participants were invited to comment on the questionnaires, spontaneously.

The data collection occurred on May 6, 2019. The eighteen participants represented the population of the class. Before answering the questionnaire, the researcher instructed the participants on the different sensory channels of perception and their influence on the learning process. All the questionnaires were tabulated in MS-Excel, and were analyzed using descriptive statistics.

5 RESULTS AND DISCUSSION

The results of the data analysis showed that 52% of the participants are kinesthetically learning-oriented. According to Fleming (2001), these are people who prefer to learn through practice, by performing an activity, and being autonomously involved, i.e., testing their skills. Despite this preference for learning by doing, there is nothing to prevent the teacher from encouraging the student to try other ways of learning. The point here is that the student should be allowed to remain connected to reality, i.e., to the purpose of learning.

The use of senses such as sight, touch, taste, and smell is characteristic of kinesthetic learning-oriented individuals (Fleming, 2001). In a classroom context in which students are mostly kinesthetic-oriented, their learning skills can be better developed through practical experiences and interactions. The teacher should use different Knowledge Management tools and practices to promote a good learning environment that engages everyone in the learning. Nonaka,

Toyama, and Konno (2000) reinforce the idea that a favorable environment for the creation of knowledge is one in which group and interaction activities occur spontaneously, to facilitate the creation and sharing of knowledge. Activities that would be very constructive for individuals with the kinesthetic profile.

Another perception channel identified through the questionnaire is aural learning-oriented individuals, corresponding to 25% of the students. This learning style is characterized by those ‘who learn more efficiently by hearing and like to be provided with spoken instructions. These people prefer discussions and dialogues, and problem-solving usually happens through discourse. Another aspect pointed out by the literature concerning individuals who prefer the aural learning style is that they can be easily distracted by sounds. In this case, they prefer to learn through oral communication (Fleming, 2001). Lum (2011) and Almeida (2010) agree with Fleming (2001) that people with this profile prefer spoken messages, so in the classroom, they like discussions, and when they can read and whisper aloud during an activity. They need to hear their voice in order to internalize the information. They learn best using resources such as discussions, chat, and tutorials, or other activities that involve information being spoken or heard. Some strategies can be used by the teacher in the classroom, to help aural learning-oriented students include: i) reading notes or texts aloud in a clear voice; ii) group discussions; and iii) reviewing content by reading aloud at the beginning and end of the class. It is evident that through this channel, students will be able to learn more efficiently when using verbal activities, discussions, or even talking and listening to what others have to say.

Our analysis also showed that 23% of the participants are visual learning-oriented. This means they learn better through visual channels and prefer to receive information through visual demonstrations and descriptions. Visual learning-oriented people often make lists to help them organize their thoughts.

Curiously, none of the participants proved to be reading/writing learning-oriented. Considering that reading and writing are fundamental skills in schools, this is surprising. However, teachers and educational managers have an opportunity to reflect on the characteristics of the student’s learning and structure new ideas and Knowledge Management practices and tools that will create new insights for learning within the classroom. Table 3 present our suggested Knowledge Management tools that can cater to the different learning styles identified in this paper.

Table 3
Knowledge Management tools to cater for different learning channels

Learning Channels	Tools
VISUAL	Mentoring Best practices Benchmarking Knowledge mapping Organizational memory Workflow system
AURAL	Narratives Mentoring
KINESTHETIC	Practical community activities Mentoring

Source: The authors

6 CONCLUSION

This study identifies the learning channels of a group of students of pedagogy students at a University. The results indicate a heterogeneity in terms of preferred learning channels, with 52% kinesthetic learning-oriented, 25% aural learning-oriented, and 23% visual learning-oriented. Furthermore, we found clues in the literature that Knowledge Management might offer tools and practices for teachers seeking to improve their students’ learning, according to their preferred learning channels. For instance, in the classroom visual students could learn whether the teachers provide an environment based on mentoring, best practices, benchmarking. The same methods could be applied for aural or kinesthetic students, but using different Knowledge Management tools. Looking closely at the students’ profiles and preferred learning channels, we found that the

teachers need to reflect on their practices in the classroom, considering that students today are part of an information society that imposes continual and intense cultural, economic, and technological changes.

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