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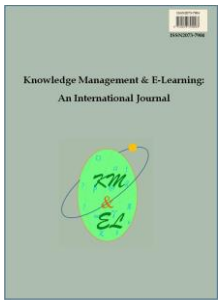

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Continuous-learning work environment: A study with developers in software development organizations

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Abstract: In today's economy of knowledge, knowledge is considered as the most important element in the processes related to products and services in most organizations including software development organizations (SDOs). It is essential for SDOs to create a work environment that supports continuous learning in order to deal with the challenges of the new economy and remain competitive in the market. This study aims to perceive how the work environment in SDOs supports continuous learning in multiple ways. The specific objectives are to understand and describe the characteristics of the SDOs' work environment which demonstrate the occurrence of continuous learning and to understand how developers apply the resources and structures available in this environment for their learning. Semi-structured interviews were used to collect data from the subjects involved in the software development process. Seven common characteristics were identified in all the participants' organizations, which are also typical in a work environment conducive to continuous learning: continuous learning as a responsibility and a competitive advantage; emphasis on innovation and competition; an open and error tolerant environment; supporting structures and resources; reward and recognition systems; leader support and peer support. Based on the result, this paper proposes a continuous learning model in software development environments.

Keywords: Continuous learning; Work environment; Software development organizations

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1. Introduction

The Brazilian market for software and services has increased considerably in the last years. According to ABES - Brazilian Association of Software Companies (ABES, 2016), Brazil is considered the seventh largest market in the world, generating US$ 60 billion in 2015, which represents 3.3% of the Brazilian GDP and 2.7% of total investments in Information Technology (IT) worldwide. From this amount, US$ 12.3 billion came from the software market, a growth of 17.5% compared to the data of 2014. About 13,950 companies dedicated to the development, production, and distribution of software in the national market have been identified.

However, the fierce competition is manifested in the same proportion as the opportunities. National software competes among each other and with those from foreign countries since there are not many trade barriers or legal restrictions against importing international products (Tonini, de Carvalho, & de Mesquita Spinola, 2008). Moreover, this industry is distinguished by the rapid pace of evolution, which brings frequent changes related to products, services, processes, and technology itself (Maurer, Pierce, & Shore, 2002; Niasi, 2009; Toniolo & Martins, 2011; Corniani, 2015).

According to Albertin (2000), the economy today denominated "economy of knowledge" is based on the application of human knowledge to everything it produces and how it is produced. Knowledge is considered the most important element in the processes related to products and services, from their development to their delivery and support in the application. The added value is acquired through human intelligence

instead of the physical effort of workers. Innovation, rather than access to resources or capital, becomes the critical factor because in this new economy, being able to enter and remain in the market is difficult when the products have a competitive life of no more than one year, one month, one week, or a couple of hours, as it happens to financial products. As a result, according to Hwang and Xie (2017, p.372) "In the meantime, the fast development of technologies is affecting the way of knowledge management and learning design as well as the learning context ".

Clients are becoming more demanding and expecting companies to provide better quality, differentiated products, and low prices. For this reason, the key assets in organizations will be those able to develop new products and services, answering to the expectations of the market and to the proposal of the new economy: make your own products obsolete before your competition does (Perez & Famá, 2015; Tidd & Bessant, 2015; Wingard & LaPointe, 2015).

Therefore, it is essential for Software Development Organizations (SDOs) to create a work environment that supports continuous learning in order to deal with the challenges of the new economy and remain competitive in the market.

Although the literature has not yet introduced a clear and convincing definition, continuous learning has been discussed in terms of people, tasks and organizational characteristics (Tracey, Tannenbaum, & Kavanagh, 1995). It is present in the work environment when all individuals seek to learn, constantly, through the conscious collaboration between organization and staff. In a work environment conducive to continuous learning, knowledge acquisition is facilitated, in addition to being understood as a responsibility of each employee (Willis & Dubin, 1990; Luo, 2007; Van Breda-Verduijn & Heijboer, 2016; Hennekam, 2015).

The main objective of this paper is to perceive if there is a work environment conducive to continuous learning in SDOs. The specific objectives are (i) understand and describe the characteristics of the SDOs' work environment which demonstrate the occurrence of continuous learning; (ii) understand and describe how developers apply the resources and structures available in this environment for their learning.

2. Continuous learning

The first continuous learning study identified was published by the authors Rosow and Zager (1988). In the following years, the theme continued to be discussed, however, in certain periods, no research was conducted. For example, in the 1990s, the papers of Willis and Dubin (1990), Tannenbaum (1997), London and Smither (1999) were published. After that, other important papers were published, like Maurer and Rafuse (2001), Flynn, Eddy, and Tannenbaum (2006), Sessa and London (2008), Maurer and Weiss (2010).

This scenario is similar to that described by Easterby-Smith, Crossan, and Nicolini (2000), about the scientific production on "learning in organizations". According to these authors, the discussion about this topic can be compared to the metaphor of a volcano, sometimes in great activity, other times in a dormant state.

Continuous learning offers a new and challenging answer to the ever-changing nature of the economy and the workplace. For Rosow and Zager (1988), it addresses obsolescence through a perspective that supports learning. This approach emphasizes the

evolution of conventional training, in which the individual depends on someone else to learn, acting merely as a recipient of information (Gagnon, et al., 2015).

Individuals are oriented to development and learning. The orientation towards development motivates them to expand their knowledge base, while the one towards learning allows challenges to be perceived as opportunities to learn. People involved in continuous learning strive to excel even when they have a satisfactory level of performance (Maurer & Weiss, 2010; Antonoaie & Antonoaie, 2014).

After conducting a survey of the scientific production about this theme, seven characteristics of a continuous-learning work environment were identified and discussed in the following sections.

2.1. Continuous learning as a responsibility and a competitive advantage

At a continuous-learning work environment, the staff has the perception that knowledge is key for the company's competitiveness and for their own professional success. This is the reason why learning is perceived as a responsibility and a necessity. The organization offers the support and the necessary resources so that the employee can acquire new skills, while searching, by his own initiative, for new learning experiences (Rosow & Zager, 1988; Willis & Dubin, 1990; Tracey et al., 1995; Maurer & Weiss, 2010; Hennekam, 2015; Gagnon et al., 2015).

2.2. Emphasis on innovation and competition (inside and outside of the work context)

A continuous-learning work environment is also characterized by the emphasis on innovation and competition, inside and outside the organizational context. Both the company and staff strive to elevate their performance level. Likewise, one can state that there is healthy competition among the employees (Rosow & Zager, 1988; Maurer & Weiss, 2010; Tracey et al., 1995). The fact that the company acknowledges good ideas motivates the employees to search for new learning experiences in order to offer contributions that stand out from those presented by their peers. When realizing the multiplicity of individual knowledge present in the workplace, the staff seeks to learn to ensure his place in the company, as knowledge is considered a professional advantage (Willis & Dubin, 1990; Antonoaie & Antonoaie, 2014; Gagnon et al., 2015).

2.3. An open and error tolerant environment

Organizations motivate their staffs to express their opinions and recognize the effort made to contribute in the discussions, even when these expressed ideas are not valid for the issue in question (Tannenbaum, 1997; Flynn et al., 2006). When companies hinder employees to express their ideas or to apply new methods that can be risky, the work environment suffocates learning and causes organizational stagnation (Eddy, Tannenbaum, Lorenzet, & Smith-Jentsch, 2005), besides the atrophy of skills that the individual already possesses by its disuse (Tannenbaum, 1997; Flynn et al., 2006; Antonoaie & Antonoaie, 2014). When failures and errors are perceived as elements in the learning process, there is less anxiety to learn (Edmondson, 1999; Maurer et al., 2002; Rosow & Zager, 1988).

2.4. Supporting structures and resources

A continuous-learning work environment possesses structures and resources that support knowledge acquisition and its application (Maurer et al., 2002; Tracey et al., 1995; Antonoaie & Antonoaie, 2014). Management can support learning by establishing training and development programs, providing seminars in site, keeping an updated library, using advanced technology equipment, promoting rotation of tasks, developing partnerships with higher education institutions, among other strategies (Maurer & Rafuse, 2001; Willis & Dubin, 1990; Lolli et al., 2016).

2.5. Reward and recognition systems

At a continuous-learning work environment, contributions to the work are rewarded through the recognition of the organization and/or through financial rewards, like promotions, bonuses, among others (Rosow & Zager, 1988; Tannenbaum, 1997; Gil & Mataveli, 2016). For that, performance evaluations may be applied to measure the skills gained in formal and informal events – organized or not by the company – because the learning acquired in different contexts is valued (Kolb, 1984; Maurer et al., 2002; Willis & Dubin, 1990).

2.6. Leader support

When the leader does not support learning, the employees show apprehension about expressing their opinions or living new experiences that may pose risks and jeopardize the regular flow of work (Eddy et al., 2005; Maurer et al., 2002; Willis & Dubin, 1990; Antonoaie & Antonoaie, 2014; Gergen, 2016). Learning thrives when the leader encourages his team to try something new – a new goal or new methods of production – or when asking for suggestions on how to improve team performance (Sessa & London, 2008).

2.7. Peer support

The individual receives peer support during his learning when his co-workers evaluate his performance, help him execute complex tasks, take over his tasks in his absence – due to the acquired knowledge about "who can do what" in the workgroup – and, support him to learn complex tasks that require a considerable intellectual effort (Flynn et al., 2006; Maurer et al., 2002; Sessa & London, 2008; Tannenbaum, 1997; Tracey et al., 1995; Antonoaie & Antonoaie, 2014).

2.8. Work environment and the search for continuous learning

According to Edmondson (1999), group structures based on the work environment (context support) can determine how developers will interact with each other and with external individuals, and enhance cooperation through communication, generating a greater cohesion among members. For Edmondson (1999, 2002, 2004); Cannon and Edmondson (2001, 2005) and Edmondson and Nembhard (2009), the work environment (context support) involves reward and recognition systems which value individual achievement and can amplify competition and generate antagonism among team members. It also includes information systems, which can provide the team access to relevant information for developers, especially through the so-called Transactive Memory Systems - TMS (Edmondson, Dillon, & Roloff, 2007; Kozlowski & Bell, 2008). And

finally, available resources, such as technology, equipment, training and adequate time for the completion of group tasks, which promote commitment to learning-oriented activities.

Furthermore, the continuous learning identified in the work environment can also be influenced by the coaching behaviour of the team leader (Edmondson 1999, 2002, 2004), who will lead the group through typical coaching activities, such as guidance and leadership. These activities are important when they may contribute to the efficacy of the work group. The coaching assignments refer to the direct interaction between the manager (leader) and team members and aims to develop individual and collective skills to achieve the expected results.

A leader who also provides coaching must be open and accessible to ideas and questioning, able to identify the interests and talents of team members and intervene when requested or needed, providing clarification and feedback. The leader can use coaching to smooth the differences of power within the group, thus neutralizing both personality differences between members and the conflicts resulting from them, consequently contributing to a climate conducive to learning. The context support mentioned here may allow the developers to feel comfortable to learn continuously and present a high level of efficacy (Edmondson 1999, 2002, 2004).

3. Method

This research was conducted applying a qualitative approach. Considering the objectives proposed in this paper, the qualitative research seemed the most adequate since there are no reliable explanations to the proposed problem, hence the need to adopt an exploratory and descriptive approach (Godoy, 1995). For Berg (2001), the qualitative research answers questions by investigating social environments. It allows the researcher to share in the understanding and perceptions of the individuals who live in those environments, such as interpret people's behaviours and the meanings they attribute to the situations experienced. This paper can be considered a multiple case study when the researcher identifies the need to study several individual cases that keep an important correlation with each other in order to understand a phenomenon as a whole (Yin, 2006).

Four SDOs were studied following Yin's (2006) argument. For the author, even when the research is based upon two case studies, the possibility of replicating the results in contexts with similar conditions is greater than in a single case study. Table 1 brings a brief description of the companies participating in this case study, which have decided not to disclose their business names.

In order to obtain information from people with a consolidated perception of their work environment, the professionals interviewed were those involved in the software production process of the participant companies who had been hired for at least one year, such as requirement analysts, responsible for identifying clients' needs and formally reporting the software features to meet them; programmers, who develop the software through programming languages according to their project, and so on. In this paper, this group is denominated 'developers'. The developer interviewed with the least amount of time at an SDO had been working there for 3 years.

It should be noted that this paper is part of a much larger study resulting from a doctoral thesis. Although the interviews were conducted in November 2011, the data was sent again to the researched companies in the months of March and April 2016 to be updated and revalidated. Thus, new information was aggregated, and others disregarded

when compared to the original data. Table 2 presents the characterization of the developers who participated in this study:

Table 1
Studied companies and their main characteristics

SDO	Activity Description	Main Characteristics
A	Offers information technology solutions: customized Project development; financial market and public administration products; outsourcing.	Established in 1991, with regional branches in the southeast, south and northeast Brazil and clients in over thirteen Brazilian states. Employs around 250 people.
B	Specializes in developing systems for academic management. Competitive advantage related to the professional management of educational institutions processes in a simple, but technological and efficient way.	Established in 1989, with branches in the south and southeast Brazil and clients including public and private educational institution. Employs around 150 people.
C	Its large portfolio includes a software factory in southeast Brazil. It is certified in the CMMI (SEI) Level 3 and ISO 9001-2000 (ABNT) standards to meet market demands.	Established in 1991, has clients from the public and private sectors. Employs around 1.500 people, of whom 70 work in the software factory.
D	Provides services to the corporate and government Market. Performs outsourcing projects in systems development and maintenance all over Brazil, through its software factory or outsourcing.	Established in 1994, with branches in southeast Brazil. Employs around 200 people.

Table 2
Characterization of interviewees

Researched SDO	Interviewed Employee	Job Description	Time with the company
A	Developer 1A	Director of Operations	4
	Developer 2A	Project Manager	3
	Developer 3A	Requirement Analyst	3
B	Developer 1B	Customer Service Team Leader	7
	Developer 2B	Business Specialist	8
	Developer 3B	Analyst and Programmer	6
C	Developer 1C	SEPG Manager	12
	Developer 2C	Project Leader	13
	Developer 3C	Analyst and Designer	8
D	Developer 1D	Technology Manager	7
	Developer 2D	Analyst and Programmer	5
	Developer 3D	Analyst and Programmer	12

There were three interviewees in each SDO due to data saturation, i.e., when comparing the answers of the second interview with the first, there were considerably more similarities with few specifics. Therefore, three interviews in each organization were enough to meet the objectives of this study.

Considering the background and theory of this study and Gibbs' (2009) guidelines about concept-based coding, categories have been established that represent the construct 'Continuous Learning Work Environment'.

This concept-based coding enabled a matrix for the development of the interview script regarding each one of the characteristics present in the continuous learning environment, as mentioned in the theoretical framework. Table 3 shows the interview script created.

Table 3
Characteristics of a continuous learning work environment

Categories	Questions
Continuous learning as a responsibility and a competitive advantage	(1) In your opinion, can learning contribute to the competitiveness in the company?
	(2) In your opinion, how important is learning in order to perform well your job?
Emphasis on innovation and competition (inside and outside work context)	(3) How can learning assist in handling competition in the software market and work context?
An open and error tolerant environment	(4) Can developers openly express their ideas or question the ideas from their peers and superiors during projects?
	(5) How do superiors and the team react when a developer makes a mistake during a project?
Supporting structures and resources	(6) Can you tell that the company offers the resources and structures needed so that developers can acquire the knowledge and skills required by the projects?
Reward and recognition systems	(7) How does the company, as a whole, react when a developer makes a valuable contribution to the improvement of a service or product provided?
	(8) How can developers be aware whereas the company is pleased or not with their performance?
Leader Support	(9) How does the project leader contribute to your learning?
Peer Support	(10) How do project team members contribute to your learning?
	(11) How does the team respond if one of the members needs to be absent during a project?

The data collection method adopted was the semi-structured interview, which is composed of a pre-established set of questions aiming to assist the researcher to understand the meaning attributed by the developers to the questions and situations related to the study through the analysis of the descriptive data collected in their speech. Each characteristic identified from the literature generated pre-determined questions as a way to start the research in each SDO, following the objectives of this study. This interview script did not follow a pattern, the order of the questions was inverted or modified according to the needs for collecting the desired data (Godoy, 2006). This was the only method applied on the grounds that the participating companies did not allow the participant and non-participant observation nor the documentary analysis.

The interviews were transcribed by the authors, who used a text editor. Afterwards, the files *.txt were inputted in the *Weft_QDA* software, which processes qualitative data through four basic functions: organized data storage – in analytical or demographic categories elaborated by the researchers; data search and classification by categories: interview transcripts, field notes, documents, reflections or observations; data correlation – established through several queries; search results available in text or quad.

The codes and categories were established after a thorough reading of the transcripts aiming to identify parts of the texts that were correlated.

Coding is the process in which the data being analysed is defined, and it involves identifying and registering one or more pieces of text or other data, as parts of the general framework that, somehow, exemplifies the same theoretical and descriptive idea. Usually, several passages are identified and then related to a name for the idea, i.e., the code. Thus, all the text, among other elements, that refers to the same thing or exemplifies the same thing is coded with the same name. Coding is a way to index or categorize the text to establish a structure of thematic ideas about it (Gibbs, 2009).

According to Gibbs (2009), after identifying the categories, it is necessary to group them following a coding hierarchy. The categories that are similar or refer to the same topic are kept in the same branch of this hierarchy. The general category is denominated "parent code" and its associated category is denominated "child code". This kind of coding hierarchy can be better understood by analysing Fig. 1.

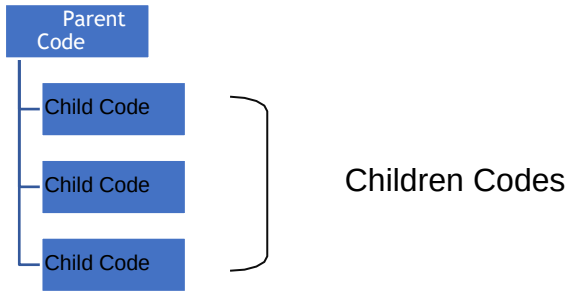

Fig. 1. Coding Hierarchy, adapted from Gibbs (2009)

For Gibbs (2009), this kind of hierarchy brings several advantages: (1) it enables a better organization of data; (2) it is a data analysis itself, as the process of categorizing the answers allows the author an understanding of the interviewees' worldview; (3) prevents duplicate code, especially when there is a large amount of coding; (4) it assists

you to notice the range of possibilities for interpreting the elements – actions, answers, feelings – once the codes or themes can have dimensions; (5) it allows some analytical questioning, such as wonder if a person, who performed action X in a certain way, did also perform action Y. In the *Weft_QDA* software, data categorization follows Gibbs' (2009) guidelines.

4. Results and discussion

The characteristics of a continuous learning work environment that describe how developers apply the resources and structures to create a learning environment identified in all SDOs that participated in this research are presented in Fig. 2:

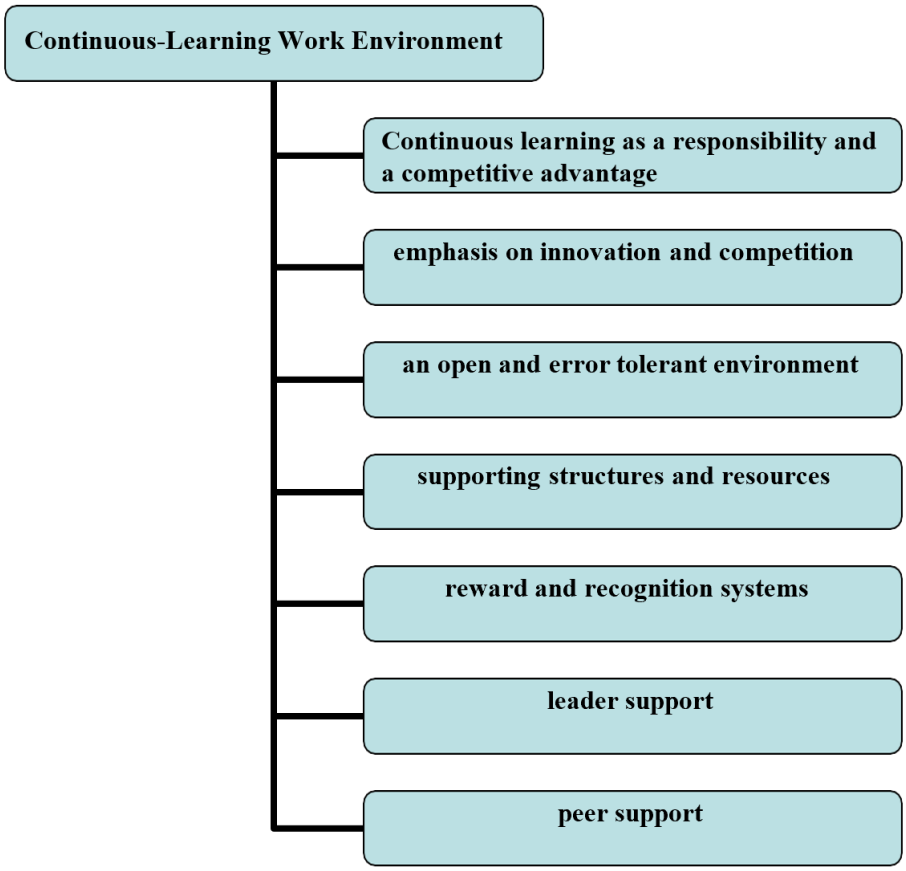

Fig. 2. Characteristics of a continuous-learning environment in SDOs

Next, in order to facilitate the organization of this study, each characteristic identified from the developers' speeches collected through the semi-structured interview is commented on separately. The speeches were identified from the denominations attributed to the developers of each SDO, according to Table 2.

4.1. Continuous learning as a responsibility and a competitive advantage

The incentive from the SDO can contribute to maintaining a continuous learning process in the work environment. The culture of a continuous learning process is implemented as a responsibility and an important competitive advantage. As reported by one of the developers from Organization B:

> *"Lately, here at the company, we have been instigated to research more, learn more, acquire more knowledge, never to become complacent and accommodated at the stage of what you already know is enough." (DEVELOPER 1B)*

The SDOs motivate the developer to experience new situations, new roles, to improve their internal repertoire of knowledge.

> *"The company gives you the opportunity to become a consultant. With my experience in the field of developing several projects, working with customer service, I mean, with several products and services, I was able to provide consultancy, teach the courses I taught. And in order to do that, I had to improve myself even more. In other words, it is a continuous cycle." (DEVELOPER 2D)*

The developer is encouraged to participate in training courses related to his area of expertise.

> *"The company supports you if you know of a course in your field that is going to contribute to your work." (DEVELOPER 1C)*

4.2. Emphasis on innovation and competition

Developers reported that the clients suppose they are being served by a company with highly qualified professionals, especially because of the educational background and experience of staff, which shows the value of knowledge to the company's competitiveness:

> *"I believe the company has good professionals. It is a matter of individual competence. We have many certified professionals, for instance. And I think that gives some reassurance to the clients. Because the client says: 'Hey, I have an employee at my disposal, someone trained, with a certificate, someone qualified to do this job'. So, I believe that also makes a difference when the client decides to hire the company to provide systems." (DEVELOPER 2A)*

In the developers' perception, the company is successful in the industry by constantly innovating and generating new technologies in the projects. A developer from Organization C stated that:

> *"The company can handle the competition due to innovation. One of the founding members of the company likes to remind it to us, as the company was established 24 years ago. He says: 'when we launched a new product, the competitors were still thinking about doing it'." (DEVELOPER 1C)*

For the developers, there is healthy competition among the members of the developing group. They try to distinguish themselves for the satisfaction of being able to solve a problem or innovate: Sometimes you do not want to be stagnated. You want to do something new. That project has N activities, and one of them is new, nobody has done it before. So, you want to be the first to take it and solve it. The internal competition here is like this.

"You do not want to take anyone's place." (DEVELOPER 2B)

Furthermore, the developers suggest that this "healthy competition" among staff must be continuous to be able to handle the fierce competition present in the industry of SDOs. Those who do not possess this behaviour are perceived as "stagnated", so they are not willing to contribute to enhancing the company's competitiveness:

"I think that there is competitiveness even in the soccer team. In my opinion, if it is not present, it is because everybody is stagnated. And this person cannot help the company to innovate and be differentiated from the other software providers." (DEVELOPER 1A)

Nevertheless, it is not enough to have a considerable repertoire of knowledge acquired through continuous learning if the developer does not wish to apply it and share it with the organization.

I received a question last week, something like this:

"What do I have to do to become a senior here at the company? I mean, do I have to get a certification? Do I have to….'. I said: 'Dude, here at the company you are not assessed just by this kind of thing. There is no point in being a guy full of certificates, be the expert guy, if you are not able to share this with other people, if you do not have the attitude to apply this here, in the company – then, your knowledge is not worth to the company." (DEVELOPER 1B)

4.3. An open and error tolerant environment

Developers share their opinion without apprehension when discussion projects:

"[…] but, even so, everybody is free to express themselves, at least to share their point of view. Maybe their point of view will not be the final decision. But each and everyone's point of view is considered, with the same relevance, no matter their rank, salary or time in the company." (DEVELOPER 1B)

Software experts have complete freedom to suggest ideas to improve the standard software process adopted by the organization. These suggestions are forwarded to the SEPG - Software Engineering Process Group - responsible for evaluating and promoting the continuous improvements in this process.

We have a team who is kind of the process' keepers. Here, we call this team SEPG. Well, it's nice that when I worked with customer service and the MPSBr started to be implemented, I noticed many things that could be changed. I would come up to the manager, for example, and say:

"'Oh, wouldn't it be better if this was done like that?'. And he would answer: 'Dude, send an e-mail to the SEPG team and then we can assess it and, if it really is a better solution, we will change the process.' So, the process was altered several times." (DEVELOPER 1D)

It was possible to verify that developers can easily request information from their superiors:

"People who work here at the company do not have the culture of: 'I cannot go to my superiors'. This does not happen here, in any sector. If you need any information from management, you can easily get to the company's leaders and ask them. The guy might even be unable to tell you the answer at that moment. But

he will not say: 'Why do you want to know that?' So, there is complete freedom of speech in this company." (DEVELOPER 2A)

Moreover, it was identified that the project manager is open to developers not agreeing with him about his feedback on job performance:

"After general feedback, I usually call one by one and review it. Then, I say: 'Look, can you see it? Is this really it?' So, there is always a chance for the person to question the feedback." (DEVELOPER 1A)

In some SDOs, developers participate in the strategic planning of the company. Top management assesses all suggestions received:

"For example, here at the company, everybody participates in strategic alignment issues. So, it is nice that, when we are deciding strategic alignment, there is this whole process." (DEVELOPER 1B)

The results also demonstrated that the SDOs see errors as part of the learning process. The errors and their respective solutions need to be recorded in the "Lessons Learned" report, which is stored in the repository of the company's knowledge assets. This record contributes to the continuous improvement of projects because by assessing these documents, developers can recognize the errors made in past projects in order to avoid them (Busari & Ngonini, 2015):

"Our process suggests, for instance, that those lessons learned should be read before starting a new project. So, if my next project will use DB2, then I am going to get similar projects and check which are the lessons learned from them. This prevents you from making the same mistakes." (DEVELOPER 2A)

4.4. Supporting structures and resources

The SDOs apply different information and communication technologies to promote interaction and knowledge sharing among developers, such as forums, wikis, e-mail, telephone, and text or voice chat tools:

"[...] so, we have a wiki. The analysts are responsible for the input of the wikis" (DEVELOPER 1C); "We have an internal e-mail for the team where everyone sends their news to – we share this well." (DEVELOPER 1D)

It was observed that SDOs frequently seek to promote internal training events. Furthermore, in some organizations, there is a specific team to receive the demands of professional improvement and organize these events. First, this team verifies if there is within the staff members someone who is an expert with the required knowledge to give this training. Otherwise, an outside expert is hired:

"The company always tries to offer training, sometimes even using a staff member to do it." (DEVELOPER 2C)

External courses for professional training, provided by educational organizations or companies that develop the technology applied in their products, are financed by SDOs when this training demand is identified or when it adds value to the organization:

"[...] there are some cases when no one here has the necessary knowledge to give this training. Then, it is hired outside the company." (DEVELOPER 1A)

Formal and informal meeting rooms are available in SDOs. Some of them are even designed to create a relaxed and informal atmosphere in order to facilitate

discussion and development of ideas. One example is the "Creativity Room" in Organization B, with mattresses and cushions for taking a rest, videogames, games and books.

Organization D also has a recreation room with a similar atmosphere. The open layout adopted by SDOs, with no partitions or doors, where developers sit next to each other, facilitates discussion and knowledge sharing. The SDOs also maintain, within their premises, a library to store the main literary works used by software specialists while at work.

Therefore, the physical structure and technological resources available in the SDOs are conducive to continuous learning by allowing the interaction and the sharing of knowledge and experiences between developers. Thus, developers have the perception that the company, as a whole, encourages and supports continuous learning by offering the necessary conditions for the staff to learn.

4.5. Reward and recognition systems

The SDOs acknowledge the dedication, effort and good results of their staff. One example is the hiring of trainees who performed well during the internship period:

> *"There have been cases here, in this very own team, when we hired a trainee for an internship position and later he became a permanent employee. Well, for us it is much better this process of personal growth inside the company, not only for the knowledge but also for the career." (DEVELOPER 1D)*

At the end of a project, the company organizes a gathering as a way to recognize the work performed by the staff:

> *"usually, at the end of a project, we have a company gathering to both further integrate the team and validate what has been achieved as a great result." (DEVELOPER 1B)*

The results demonstrated that SDOs apply formal evaluations to measure employee performance. These evaluations can adopt the method where the employee is assessed by his superior or the method where team members assess each other.

In some SDOs, there are periodic evaluations, i.e., they occur in a shorter time interval; in others, in a longer time interval. Performance evaluation can be used as an indicator for career planning, including for salary increase:

> *"[...] this periodic evaluation feedback is one of the factors used to identify if the employee is going to have a salary increase or not. That does not mean that you will get a raise every six months. But it is one of the criteria." (DEVELOPER 2C)*

4.6. Leader support

Leaders facilitate continuous learning by providing a positive and, mainly, instructive feedback on job performance, rather than a mere evaluation opinion, or comparison to other team members' performance. As stated by the subjects interviewed in this research, the project leader gives an 'advice feedback' when he informs the decision made might not have been the most efficient:

> *"He always comes with the advice feedback: 'Look, let's not do it that way, or no, it is not like that, you should have done like this." (DEVELOPER 1D)*

The project leader gives positive feedback when he acknowledges a job well done or when he praises the dedicated effort even if the job was not performed following the expected standard:

> *"We always get that positive feedback, praising people. May it be by effort. Sometimes, the result was not the expected one, but we tried our best." (DEVELOPER 1A)*

Leaders usually take advantage of scheduled meetings to address project issues and give public or general feedback on the job performed by the team. However, if necessary, the project leader can summon a member of the team to receive private feedback, i.e., feedback on the person's specific performance.

For some developers, it is possible to learn with positive or negative feedbacks. Therefore, the project leader contributes to the occurrence of continuous learning in the work environment by evaluating his subordinates aiming to eliminate the deficiencies and encourage professional improvement:

During the job activities, he already calls you:

> *"'Look, you have not done this properly. You can do better'. Or: 'Look, congratulations. Look what a great job you have done'. It can be a positive feedback as well as a negative one. But that feedback, you listen to it and learn with it. Good or bad, you are learning." (DEVELOPER 2B)*

The project leader is always open to the developers whenever they want to discuss issues related to the project, disagree with his decisions or offer improvement suggestions:

> *"If a person disagrees or does not like the leader's opinion, no problem, he can make an improvement suggestion. That is really the idea, to focus on improving, evaluating what we have done to optimize our future results." (DEVELOPER 1D)*

The project leader encourages informal discussions among team members to instigate reflection on the ongoing job and establish better solutions:

> *"What I like to do with these guys is to have a gathering to discuss these issues: problems, eventually they will arise '[…]. I try to foment discussion among the team to generate improvement suggestions or solutions." (DEVELOPER 1A)*

Leaders also contribute to continuous learning when they support the developers to learn from new experiences and to constantly seek their professional improvement:

> *"Well, so, I am constantly trying to learn what it is that a person wants, what is his goal, to point him in its direction. Or even to say: 'Look, I know that you like that, but you are very good at this. Why don't you try it?'" (DEVELOPER 1A)*

Moreover, the project leader identifies the developers' need for professional improvement. Leader support for continuous learning may consist in establishing, with his subordinate, learning goals and career plans or identify the need for training and authorize his participation in professional training events. During the project, the leader monitors the team's work, intervening when necessary. At that moment, the leader takes the role of a facilitator during the problem-solving events and, consequently, during the developers' learning process:

> *"[…] And she always provides the necessary resources for us to take the next step, move forward with the projects. She provides the necessary support or seeks this*

support. So, she is always taking this role, the role of facilitator." (DEVELOPER 1C)

4.7. Peer support

Developers contribute to the continuous learning process of their peers when they share their knowledge and experiences in day-to-day work. This support is essential, especially to the least experienced employees.

Every day, we have a meeting. It's a 15-minute meeting. It's about sharing what you are doing, or have done, and discuss any items you may have difficulties with. Then, we get back to that item, that someone has difficulty with. You learn with that person. So, someone says:

"I'm having problems developing this item. Have you ever had this problem? Can anyone help me?" (DEVELOPER 1B)

Developers offer support to those who are experiencing some problems with a task without judging them, and when mistakes are made, the team tries to guide them instead of blaming them. Software development is faced as teamwork.

"Look, the mistake is not someone's responsibility. It's the team's responsibility." (DEVELOPER 2C)

Furthermore, developers contribute to peer learning when providing feedback on their performed tasks, mainly by highlighting the mistakes and improvements that can be established.

"Then, for example, now I am modeling a database, but it impacts directly on other modules of the project. So, sometimes, the other requirement analyst calls me or texts me on messenger and says: 'Wow, look, this is wrong. Fix it'" (DEVELOPER 2A)

5. Conclusion

At the end of this case study, seven common characteristics have been identified that also indicated the presence of a work environment conducive to continuous learning in the four SDOs analysed. As for the characteristic "continuous learning as a responsibility and a competitive advantage", the SDOs encourage developers constantly to get involved in learning situations, either in new job roles or training courses. When an organization is able to demonstrate the importance of learning for the employee and the company itself, continuous learning becomes an organizational policy (Rosow & Zager, 1988; Kozlowski & Hults, 1987; Willis & Dubin, 1990; Maurer et al., 2002; Hennekam, 2015; Van Breda-Verduijn & Heijboer, 2016).

In order to demonstrate the theoretical implications of this study, this paper proposes a Theoretical Model typical of SDOs, in which the main characteristics of continuous learning are evidenced through an "input-output" process presented in Fig. 3.

Regarding the characteristic 'emphasis on innovation and competition', developers have the perception that the company seeks to differentiate from its competitors by constantly trying to develop quality products, innovate and introduce new technology into the projects. Moreover, developers presume that clients acknowledge the company's efforts, which contributes to its competitiveness. This concept can also be

understood to obtain the best results already acquired within a competitive market environment, mainly through the knowledge leveraged from stakeholders, as Stary (2016, p. 88) explains: "The concepts to involve stakeholders in open organizational learning activities allow identifying stakeholder-centred requirements for the envisioned approach to learning while (re-)designing work".

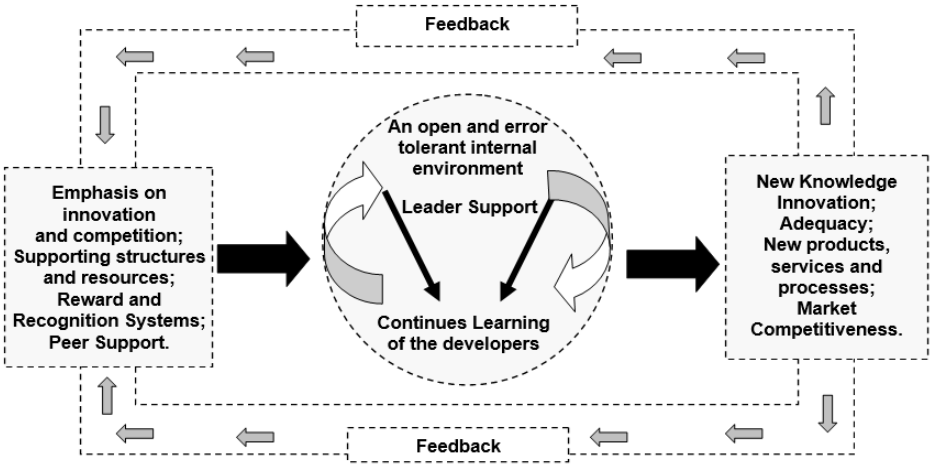

Fig. 3. Continuous learning model in a software development environment

For Willis and Dubin (1990), the organization that learns by following the continuous learning premises seeks to remain at the cutting-edge of technology, and all their staff members recognize the company is acting properly to become the best in the industry (Tracey et al., 1995; Day, 1994; Gagnon et al., 2015).

In addition, healthy competition among developers has been identified. Software experts try to distinguish themselves for the satisfaction of being able to solve a problem or innovate in projects, provided that the teamwork and the trust among team members are not shaken. When realizing the multiplicity of individual knowledge present in the workplace, the employee decides to learn and to excel to ensure his place in the organization, as knowledge is considered a professional advantage.

However, collaboration among staff members cannot be compromised. The achievements must benefit the employee, the teamwork and, mainly, the organization (Rosow & Zager, 1988; Maurer et al., 2002; Tracey et al., 1995; Willis & Dubin, 1990; Antonoaie & Antonoaie, 2014).

Regarding the characteristic 'an open and error tolerant environment', it was observed that the SDOs encourage their developers to express their opinion, even when they are not valid for the issue in question. Not recognizing these efforts inhibits the employee from participating in the decision-making process, due to apprehension that his suggestions might be rejected or even that he might be punished by expressing his opinion (Tannenbaum, 1997; Flynn et al., 2006; Antonoaie & Antonoaie, 2014).

For SDOs, the error is part of the learning process, and when an error is made, the consequence is guidance instead of a reprimand. Tasks involving new elements, dilemmas and problems to be solved, obstacles to be overcome and choices to be made in risky and uncertainty conditions, the employee is allowed to go beyond his capacity because of the atypical situations that require the establishment of new solutions and the

use of new work methods (Willis & Dubin, 1990; Sessa & London, 2008; Maurer & Weiss, 2010; Antonoaie & Antonoaie, 2014).

Furthermore, work environments that hinder learning, making it difficult to express ideas and apply new methods that can be risky, cause organizational stagnation and jeopardize innovation (Eddy et al., 2005; Gagnon et al., 2015).

Regarding the characteristic 'supporting structures and resources', it was observed that SDOs provide structures and technological resources that promote knowledge acquisition, as well as its practical application (London & Smither, 1999; Maurer et al., 2002; Rosow & Zager, 1988; Tracey et al., 1995), which also offered answers to the second objective of this study that seeks to understand and describe how developers apply the resources and structures present in their work environment during the learning process.

The technological resources of SDOs are conducive to learning by allowing the communication, the interaction and the sharing of knowledge and experiences between the developers. According to Cordes (2016, p. 605) "perhaps the most important function of communication media in the collaboration decision environment is to enable interdependent teamwork".

When the software specialists share their "Private" meanings, the data in which they are based on are challenged and the reasoning and logic which led to their conclusion are examined by the other team members. This is the moment when learning occurs, as new knowledge is generated from the combination and analysis of private meanings from the team members. This meaning, called 'Collective', is the one shared by everybody, consisting of standards, strategies, and assumptions that determine how the work must be done (Dixon, 1997, 1999).

The physical structure of the SDOs also promotes knowledge sharing. The open layout, without office partitions or doors, where developers sit next to each other, promotes discussions during work. In some of the companies, there are boards in the office so that developers can show designs representing their ideas to the team. In one of the SDOs, there is a place called "Creativity Room", reserved for moments of rest, recreation and informal meetings.

For Dixon (1997, 1999), collective learning occurs in a space designed to facilitate deep conversation between company members about topics of their interest. In these spaces, subjects interact by exchanging information and sharing conclusions and reasoning processes. People dialogue with each other rather than expose their ideas to one another. Thus, the relaxing and informal atmosphere of such spaces encourages discussions and brainstorming, promoting learning.

The study indicates that SDOs also promote professional training events to contribute to staff learning (Maurer & Rafuse, 2001; Willis & Dubin, 1990; Antonoaie & Antonoaie, 2014; Lolli et al., 2016). It is important to remember that limitations, such as lack of work equipment and supplies, insufficient or low-qualified staff, can jeopardize knowledge acquisition and application (Flynn et al., 2006; Tannenbaum, 1997).

Regarding the characteristic 'reward and recognition systems', SDOs acknowledge the dedication, effort and good results of their staff (Rosow & Zager, 1988; Gil & Mataveli, 2016). For Tannenbaum (1997), when the employee that applies new ideas is recognized and rewarded, it strengthens his individual belief that it is possible to acquire new skills to obtain better results. However, without this stimulus, the employee tends to get frustrated and lack the motivation to seek new learning experiences.

The successful application of new ideas motivates the employee to learn, despite the company's recognition or reward for that. On the other hand, if this situation persists for a long period of time, the employee might get frustrated and demotivated to learn. The employee can even decide to leave the company as his work is not being recognized (Tannenbaum, 1997).

As for the characteristics 'leader support', it was observed that the project leader supports continuous learning when he provides different kinds of feedback (Antonoaie & Antonoaie, 2014; Gergen, 2016). According to London and Smither (1999), in a continuous- learning work environment, leaders must provide positive and, mainly, instructive feedback, rather than a mere evaluation opinion, or comparison to other team members' performance. The abilities that can be improved should not be presented as weaknesses, but as a problem to be solved together – organization, leader and employee.

The leader encourages team members to express their ideas because he is always open to the developers whenever they want to discuss issues related to the project, disagree with his decisions or offer improvement suggestions. For London and Smither (1999), in a continuous- learning work environment, the leader takes into consideration not only the company's needs, but also the needs of his subordinates, i.e., he encourages the developers to express their concerns about the project or something else that is affecting their performance in the job.

The project leader encourages informal discussions among team members to instigate reflection on the ongoing job and establish better solutions (Gergen, 2016). According to Dixon (1997, 1999), informal discussions are conducive to knowledge sharing and to the development of new ideas in teams due to lack of pressure from a hierarchical structure.

Regarding the characteristic 'peer support', this study demonstrated that developers contribute to the learning process of their peers when they share their knowledge and experiences in day-to-day work. This support is essential, especially to the least experienced employees (Dixon, 1997, 1999).

The interviewees shared some insight on the relevance of continuous learning, reinforcing the need to share and understand the knowledge required so that the team can develop and achieve optimal levels of continuous improvement. Thus, developers take ownership of the company structure to continuously improve the level of shared knowledge, once the software product can only be developed through the combined efforts of all individuals and groups within the project, according to the studies conducted by Boh, Slaughter, & Espinosa (2007) and Tonini et al. (2008).

Developers, moreover, help those who have difficulty in performing a task without criticizing them and, when errors are made, they are solved by the team and those responsible for the error are not reprimanded, they are guided (Edmondson, 1999; Maurer et al., 2002; Rosow & Zager, 1988; Antonoaie & Antonoaie, 2014).

As for the limitations, one cannot generalize the data acquired to other SDOs, once the only data collection method adopted in this study was the semi-structured interview because the participating companies did not allow the observation nor the documentary analysis. For a deeper understanding of the phenomenon investigated in the case study, the researches must collect data from multiple sources (Woodside, 2010).

According to Yin (2006), data collection from multiple sources – triangulation – allows the establishment of accurate and convincing conclusions. The most common

triangulation applied in case study includes (1) interviews; (2) observation; (3) documentary analysis.

Therefore, it is necessary to apply other data collection methods to be able to achieve a triangulation. For Kelle (2001), data triangulation is the mutual validation of methods and results obtained in research, in order to identify validity risks. It is used to produce a more comprehensive image on the phenomenon investigated through the convergence of results using different methods. As a suggestion for future research, this model has yet to be tested through quantitative empirical research for validation.

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References

Albertin, A. L. (2000). *Comércio eletrônico: Modelo, aspectos e contribuições de sua aplicação*. São Paulo: Atlas.

Antonoaie, N., & Antonoaie, C. (2014). Learning organization [reviewed article]. *Bulletin of the Transilvania University of Brasov. Series V: Economic Sciences, 7*(1), 67–70.

Associação Brasileira das Empresas de Software (ABES). (2016). *Data on Brazilian market for software*. Retrieved from http://central.abessoftware.com.br/Content/UploadedFiles/Arquivos/Dados%202011/ABES-Publicacao-Mercado-2016.pdf

Berg, B. L. (2001). *Qualitative research methods for the social sciences*. Needham Heights, MA: Allyn & Bacon.

Boh, W., Slaughter, S. A., & Espinosa, J. A. (2007). Learning from experience in software development: A multilevel analysis. *Management Science*, *53*(8), 1315–1331.

Busari, O., & Ngonini, X. (2015). Learning from continuous evaluation: Principles, practices, and lessons. *Management Education: An International Journal, 13*(4), 1–14.

Cannon, M. D., & Edmondson, A. C. (2001). Confronting failure: Antecedents and consequences of shared beliefs about failure in organizational work groups. *Journal of Organizational Behavior, 22*(2), 161–177.

Cannon, M. D., & Edmondson, A. C. (2005). Failing to learn and learning to fail (intelligently): How great organizations put failure to work to innovate and improve. *Long Range Planning, 38*(3), 299–319.

Cordes, S. (2016). Virtual team learning: The role of collaboration process and technology affordance in team decision making. *Knowledge Management & E-*

Learning, 8(4), 602–627.
Corniani, A. A. (2015). Impactos culturais dentro de uma empresa devido à implantação de software para erp. *Caleidoscópio, 1*(6), 61–75.
Day, G. S. (1994). Continuous learning about markets. *California Management Review, 36*(4), 9–31.
Dixon, N. M. (1997). The hallways of learning. *Organizational Dynamics, 25*(4), 23–34.
Dixon, N. M. (1999). *The organizational learning cycle: How can we learn collectively* (2nd ed.). London: McGraw-Hill Book Company.
Easterby-Smith, M., Crossan, M., & Nicolini, D. (2000). Organizational learning: Debates past, present and future. *Journal of Management Studies, 37*(6), 783–796.
Eddy, E. R., Tannenbaum, S. I., Lorenzet, S. J., & Smith-Jentsch, K. A. (2005). The influence of a continuous learning environment on peer mentoring behaviors. *Journal of Managerial, 17*(3), 383–395.
Edmondson, A. C. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350–383.
Edmondson, A. C. (2002). The local and variegated nature of learning in organizations: A group-level perspective. *Organization Science, 13*(2), 128–146.
Edmondson, A. C. (2004). Psychological safety, trust, and learning in organizations: A group-level lens. In R. M. Kramer & K. S. Cook (Eds.), *Trust and Distrust in Organizations: Dilemmas and Approaches* (pp. 239–272). New York: Sage.
Edmondson, A. C., Dillon, J. R., & Roloff, K. S. (2007). 6 three perspectives on team learning: outcome improvement, task Mastery, and group process. *The Academy of Management Annals, 1*(1), 269–314.
Edmondson, A. C., & Nembhard, I. M. (2009). Product development and learning in project teams: The challenges are the benefits. *Journal of Product Innovation Management, 26*(2), 123–138.
Flynn, D., Eddy, E. R., & Tannenbaum, S. I. (2006). The impact of national culture on the continuous learning environment: Exploratory findings from multiple countries. *Journal of East-West Business, 12*(2/3), 85–107.
Gagnon, M.-P., Payne-Gagnon, J., Fortin, J.-P., Paré, G., Côté, J., & Courcy, F. (2015). A learning organization in the service of knowledge management among nurses: A case study. *International Journal of Information Management, 35*(5), 636–642.
Gergen, K. J. (2016). Toward relational leading. *AI Practitioner, 18*(3), 28–35.
Gibbs, G. (2009). *Análise de dados qualitativos: Coleção pesquisa qualitativa*. Porto Alegre: Bookman.
Gil, A. J., & Mataveli, M. (2016). Rewards for continuous training: A learning organization perspective. *Industrial and Commercial Training, 48*(5), 257–264.
Godoy, A. S (1995). A pesquisa qualitativa: Tipos fundamentais. *Revista de Administração de Empresas, 35*(3), 20–29.
Godoy, A. S. (2006). Estudo de caso qualitative. In C. K. Godoi, R. Bandeira-de-Mello, & A. B. da Silva (Eds.), *Pesquisa qualitativa em estudos organizacionais: Paradigmas, estratégias e métodos* (pp. 115–146). São Paulo: Saraiva.
Hennekam, S. (2015). Career success of older workers: the influence of social skills and continuous learning ability. *Journal of Management Development, 34*(9), 1113–1133.
Hwang, G.-J., & Xie, H. (2018). Editorial: Review and trend analysis of knowledge management and e-learning research. *Knowledge Management & E-Learning, 10*(4), 371–374.
Kelle, U. (2001). Sociological explanations between micro and macro and the integration of qualitative and quantitative methods. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, 2*(1). doi: 10.17169/fqs-2.1.966
Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and*

development. Englewood Cliffs, NJ: Prentice Hall.
Kozlowski, S. W. J., & Bell, B. S. (2008). Team learning, development, and adaptation. In V. I. Sessa, & M. London (Eds.), *Work Group Learning* (pp. 15–44). Mahwah, NJ: Lawrence Erlbaum Associates.
Kozlowski, S. W. J., & Hults, B. M. (1987). An exploration of climates for technical updating and performance. *Personnel Psychology*, *40*(3), 539–563.
Lolli, F., Gamberini, R., Giberti, C., Gamberi, M., Bortolini, M., & Bruini, E. (2016). A learning model for the allocation of training hours in a multistage setting. *International Journal of Production Research*, *54*(19), 5697–5707.
London, M., & Smither, J. W. (1999). Empowered self-development and continuous learning. *Human Resource Management*, *38*(1), 3–15.
Luo, X. (2007). Continuous learning: The influence of national institutional logics on training attitudes. *Organization Science*, *18*(2), 280–296.
Maurer, T. J., Pierce, H. R., & Shore, L. M. (2002). Perceived beneficiary of employee development activity: A three-dimensional social exchange model. *Academy of Management Review*, *27*(3), 432–444.
Maurer, T. J., & Rafuse, N. E. (2001). Learning, not litigating: Managing employee development and avoiding claims of age discrimination. *Academy of Management Perspectives*, *15*(4), 110–121.
Maurer, T. J., & Weiss, E. M. (2010). Continuous learning skill demands: Associations with managerial job content, age, and experience. *Journal of Business and Psychology*, *25*, 1–13.
Niasi, M. (2009). Software process improvement implementation: Avoiding critical barriers. *CrossTalk: The Journal of Defense Software Engineering*, *22*(1), 24–27.
Perez, M. M., & Famá, R. (2015). Características estratégicas dos ativos intangíveis e o desempenho econômico da empresa. *Unisanta Law and Social Science*, *4*(2), 107–123.
Rosow, J. M., & Zager, R. (1988). *Training: The competitive edge*. San Francisco, CA: Jossey Bass.
Sessa, V. I., & London, M. (2008). *Work group learning: Understanding improving & assessing how groups learn in organizations*. New York, NY: Lawrence Erlbaum Associates.
Stary, C. (2016). Open organizational learning: Stakeholder knowledge for process development. *Knowledge Management & E-Learning*, *8*(1), 86–108.
Tannenbaum, S. I. (1997). Enhancing continuous learning: Diagnostic findings from multiple companies. *Human Resource Management*, *36*(4), 437–452.
Tidd. J., & Bessant, J. (2015). *Gestão da inovação* (5th ed.). Porto Alegre: Bookman.
Tonini, A. C., de Carvalho, M. M., & de Mesquita Spinola, M. (2008). Contribuição dos modelos de qualidade e maturidade na melhoria dos processos de software. *Produção*, *18*(2), 275–286.
Toniolo, C. M., & Martins, L. E. G. (2011). Reuso de requisitos para famílias de produtos em sistemas embarcados. *Revista da Universidade Ibirapuera*, *1*(1): 32.
Tracey, J. B., Tannenbaum, S. I., & Kavanagh, M. J. (1995) Applying trained skills on the job: The importance of the work environment. *Journal of Applied Psychology*, *80*(2), 239– 252.
Van Breda-Verduijn, H., & Heijboer, M. (2016). Learning culture, continuous learning, organizational learning anthropologist. *Industrial and Commercial Training*, *48*(3),123–128.
Willis, S. L., & Dubin, S. S. (1990). *Maintaining professional competence: Approaches to career enhancement vitality, and success throughout a work life*. San Francisco, CA: Jossey Bass.
Wingard, J., & LaPointe, M. (2015). *Learning for life: How continuous education will keep us competitive in the global knowledge economy*. New York, NY: Amacom.

Woodside, A. G. (2010). *Case study research: Theory, methods and practice*. Bingley, UK: Emerald Group.
Yin, R. K. (2006). *Estudo de caso: Planejamento e métodos*. São Paulo: Bookman.