

How Does Organisational Culture Influence the Process of Change Towards PBL?

*Heilyn Camacho, Mayela Coto and Kenneth Mølbjerg Jørgensen **

ABSTRACT

With the growing demand to use pedagogical approaches to foster 21st-century skills such as problem solving, creativity, critical thinking, collaborative learning and innovation, many educational institutions have chosen to use the pedagogical approach of problem-based learning (PBL). Moving from traditional teaching to PBL, however, demands an organisational change. Although organisational culture is widely recognised as a critical success factor in the implementation of PBL, the literature provides limited insight into how it influences the implementation process of PBL. This paper provides an empirical analysis of the influence of organisational culture on PBL implementation. The research is based on the analysis of two groups involved in implementing PBL for several years. A focus group interview was conducted with each group to identify traits of organisational culture. The Organizational Culture Assessment Instrument (OCAI) was applied to identify the dominant type of culture in each group. The findings indicate that some cultural traits better support the implementation of PBL. In particular, traits of clan culture were identified to be more aligned with PBL principles. In addition, understanding the current culture of a given organisation enables people to be more aware of the level of change required to implement PBL in their organisations.

KEYWORDS: PBL implementation, organisational change, organisational culture, problem-based learning, project-based learning, type of cultures

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INTRODUCTION

In the past 15 years, many universities across the world have started the process of changing from traditional teaching (lecture based) to problem-based learning (PBL) in its different conceptions. Central ideas of this approach are that learning is constructive, collaborative, self-directed and the result of a critical-thinking process. It thus is argued that PBL promotes ownership, engagement, interdependence and the ability to make decisions (Barge, 2010; de Graaff & Kolmos, 2003; Savery, 2006).

Several theoretical and empirical contributions have concluded that organisational phenomena play a significant role in the successful implementation of PBL. These include leadership, participation and organisational culture (Kolmos, 2010; Kolmos & de Graaff, 2007; Li, Du, & Stojcevski, 2009). Yet, organisational phenomena often are mentioned only in passing as an auxiliary factor or a practical implication of implementing PBL.

A common aspect of PBL implementation models is the interaction between the pedagogy and change-management layers, which thus connect micro-level activities (at the classroom level) with macro-level structures (leadership and organisational culture). Empirical research, however, fails to include the tools, techniques and methods used to explore organisational culture and its influence on PBL implementation. Thus far, the longstanding and rich theoretical tradition of organisational culture has not been extended to work on PBL implementation with some exceptions (Kolmos & De Graaff, 2007; Li, 2013; Li et al., 2009).

When an institution of higher education aims to implement PBL, it should also consider which aspects of the organisation need to be changed. According to Li, Du and Stojcevski (2009), organisational models analysing the structure, the struggle for power, the cultural aspects of the organisation and the driving forces for change are helpful to understand an educational institution in the process of changing to PBL.

Kolmos and De Graff (2007) developed a model that considered the importance of the organisation, culture and values in this change process. Their model has a curriculum layer and an organisational and values layer. The curriculum layer includes goals, assessments, teachers, teaching and learning methods, students and content; the organisational layer comprises culture, values, physical space and resources. For Li et al. (2009), this model is useful to guide curriculum reform and to explain why some curricular change initiatives fail when only one element of the system is changed. They state, however, that this model lacks a clear definition of the 'organisation layer'.

Moesby (2004) proposes a model of change to PBL related to the vertical aspect of change in the organisation. The author argues that change occurs at different levels: individual, group/system and institutional levels. The individual level refers to an isolated, personal initiative of implementing PBL, often without any conceptual or cultural awareness of PBL. The group level is the transition process in which the organisation starts to systematically organise activities related to PBL. The highest level is the institutional level, which leads to the change of the entire organisation. Li et al. (2009) argues that this model helps identify at which level an organisation made a change; they specify, however, the need to have a more systematic method of analysing the change in an organisation when implementing PBL.

Inspired by these two models, Li et al. (2009) propose an organisational model focusing on the organisational level involving four aspects: curriculum, organisational structure and regulation, infrastructure and resources, and organisational culture. Their model has the following three characteristics. The first is cultural change focused on the organisation; without a change in the organisational culture, change to PBL is superficial and cannot be sustained because the values, attitudes and behaviours of members of the organisation do not change. Second, all aspects of the organisation are involved when conducting organisational change. Lastly, the model helps explain the deadlock and failure of organisational change in some educational institutions.

To our knowledge, Li et al. (2009) developed the best conceptual framework for change to PBL, combining elements of change from the curriculum and organisational levels. The central element of the model is organisational culture, but their work lacks a thoughtful discussion regarding this notion. They present a definition of organisational culture and an argument about the need to change the culture and create a supportive atmosphere to have a lasting change, but they do not discuss deeper organisational culture implications nor does the case presented in their paper cover the influence of organisational culture in PBL implementation.

The aim of this research is an in-depth examination of organisational culture to understand on a deeper level the implications it has on the process of implementing PBL and to get some insights for the model developed by Li et al. We accomplished this by studying the organisational culture of two groups of a public university in Costa Rica that have attempted to implement a PBL approach in the past 7 years.

These two groups are examples of complex relations and interactions that comprise parts of the university's organisational culture. In the organisational culture literature, such groups often are referred to as subcultures (Umbach, 2007). The actions and expressed values and meanings of the groups are seen as specific cultural materialisations of general phenomena which come into play when trying to implement PBL. In this way, the cultural

traits of the two groups are rich examples of the different cultural forces at play in the university where the research was conducted. As such, they provide useful examples that illustrate how culture affects the change towards PBL.

This paper addresses the following research question: How does organisational culture influence the process of change towards PBL? The next section presents the theoretical framework. The following sections introduce the methodology, the data presentation and analysis, and the answer to the research question; the final section draws conclusions.

PROBLEM-BASED AND PROJECT-BASED LEARNING (PBL)

The problem-based approach was originated in health professional education at McMaster University in Canada in the 1960s. In the 1970s, the approach was established by Maastricht University in Netherlands. At almost the same time, in Denmark, Aalborg University and Roskilde University were created with PBL as the institutional pedagogical approach, with the variation that their approach was focused on project- and problem-oriented learning (Kolmos, 2015). Since its original creation, the PBL approach has expanded to many countries, disciplines and universities, creating many variations of it.

In this work we understand PBL as described by Du, de Graaff and Kolmos (2009, p. 1): ‘the new notion of PBL represents a learning philosophy rather than the details in the organization of the curriculum and goes far beyond a narrow curriculum change. This learning philosophy encompasses both problem-based and project-based learning. Furthermore, PBL includes a cultural change and foster new epistemologies in the creation of knowledge and innovation’.

We argue that the many variations of PBL can be located between two well-known experiences: Maastricht University (MU) and Aalborg University (AAU). Moust Van Berkel and Schmidt (2005, p. 667) define the Maastricht approach as ‘a strategy that students use to explain underlying mechanisms, processes or principles of phenomena described in a problem. This strategy comprises well-known problem-solving procedures as well as scientific approaches used in research’. Dirckinck-Holmfeld et al. (2009, p. 157) define the POPP/PBL (Aalborg University approach) ‘as a dynamic pedagogy where participants bring new problem areas to be studied. The problems to work with are not pre- defined by the curriculum or faculty but brought in by the students and further elaborated in discussions and negotiations between peers, faculty and external stakeholders’.

One way to identify the PBL modalities is to use the work by Ryberg, Koottatep, Pengchai and Dirckinck-Holmfeld (2006), who argued that the level of control of the teachers and students over the problem (who controls the framing of the problem?), the process (how to define the way of work?), and the solution (to what degree is the solution open-ended or fixed?), define the variations of PBL.

Although several variations of PBL exist, all variations share core principles that we could call the DNA of PBL: It is student-centred, collaborative (team-based), organised around real and contextual problems, and interdisciplinary (Kolmos, de Graaff, & Du, 2009; Savery, 2006). In addition, they share the role of the teacher, the fact that students own the learning process, and that students must apply critical thinking to deal with the problem and to their own learning process (Kolmos et al., 2009; Savery, 2006).

Organisational culture

The transformation towards PBL can be classified as a major organisational change that demands a change in organisational culture (Li et al., 2009; Li, 2013). How organisational culture is conceptualised has been debated for many years since its emergence in organisational discourse in the 1980s. Today, organisational culture is an established tradition of its own, and many scholars and practitioners frequently use the term *culture* when they refer to how organisations are managed – but still without really having reached any consensus concerning what it is.

Within the academic community, Smircich (1983) provided an early but still important overview of different approaches to organisational analysis. She stated that culture has been borrowed from anthropology where there is no consensus about what it is. Her approach was not to reach a consensus but to differentiate between several conceptions of culture and show how these conceptions influence how people approach and work with culture. She made an important distinction between culture understood as a *variable* – as something organisations *have* – or as a *root metaphor* – as something organisations *are*. The first treats culture as a typical soft factor in organisations in line with technologies, systems, strategies, structures and so forth. Culture is seen as a homogenous integrated system of shared values and assumptions. The second treats technologies, language, stories, systems, strategies and structures as complex and ongoing materialisations and expressions of culture.

Another two perspectives for understanding culture are the functionalist view (aligned with the variable perception of culture) and the symbolic view (aligned with the root metaphor perception). The functionalist view represented by Schein, who treats culture as if it was a variable (see the discussion by Schultz [2000]) and implies a coherent integrative view of culture in which culture becomes the shared glue between people.

This model of culture, which contains three levels (artefacts, values and basic assumptions), is an example in which deep, shared, basic assumptions ensure internal integration and external integration (Schein, 2010).

The symbolic view, which relies on a system or network of shared symbols and meanings (Alvesson, 2013), does not make such hard assumptions. Instead culture is more fragmented, ambiguous, inconsistent and full of paradoxes (Martin, 1992). According to this view, curriculum – including goals, assessment systems, teaching and learning methods, technologies, principles, contents, classroom designs and so forth – is a symbolic expression of culture, which is reinterpreted again and again, used and reworked within the educational institution, which in itself is an expression of culture. Everything becomes an expression of culture. The symbolic view of culture has spilled over to an understanding of corporate identity (Hatch & Schultz, 1997) as well as to theories of sense making (Weick, 1995) and sense giving as crucial processes by which organisations can manage changes (Gioia & Chittipeddi, 1991).

More recently, culture also has been understood through discourse, meaning that culture does not have a clear centre but is a network of relations in which are embedded norms and traditions for what can be said and done. Language has gained an important position because it is seen as a primary medium for both expressing and constructing meaning (Cunliffe & Eriksen, 2011; Hersted, 2016). This view also relies on crucial shared presumptions of culture: that culture is related to history and tradition, that it is collective and relational and as such exists in between people, and that it is both transmitted and constructed through shared symbols such as language (Alvesson, 2013).

Our position in relation to organisational culture is that culture is understood broadly as the ways things are done – including the doings of language – in organisations and the meanings attached to these doings. The focus is on how people together practice, create and shape the world in action and how they make meaning concerning these actions. Culture is thus embedded in words, expressions, concepts, guidelines, structures, appraisal systems, performance management, economic systems, strategies, policies, human resource management systems, etc. It involves continuous interpretation and reinterpretation as well as a degree of shared understanding and hence shared history because otherwise people in organisations cannot communicate and understand each other. In this sense, our understanding of organisational culture is aligned with the vision of culture as a metaphor, with the symbolic vision and with culture as a network of relationships.

Types of organisational cultures

As mentioned previously, manifestations of culture can be detected in values, norms and practices that shape the unique identity of each organisation. Researchers have created some taxonomies with common characteristics that associate a particular organisation to a particular type of culture. These types of cultures have implications for organisational change (Cameron & Freeman, 1991). In their work, Cameron and Freeman (1991) combined two frameworks to organise the different patterns of shared values, assumptions and interpretations that typify organisations. They studied four attributes (dominant values, dominant style of leadership, based for bonding, and strategic emphasis) among organisations. Four forms of organisational culture emerged: clan, adhocracy, hierarchy and market, creating the ‘model of culture types for organizations’ (Figure 1).

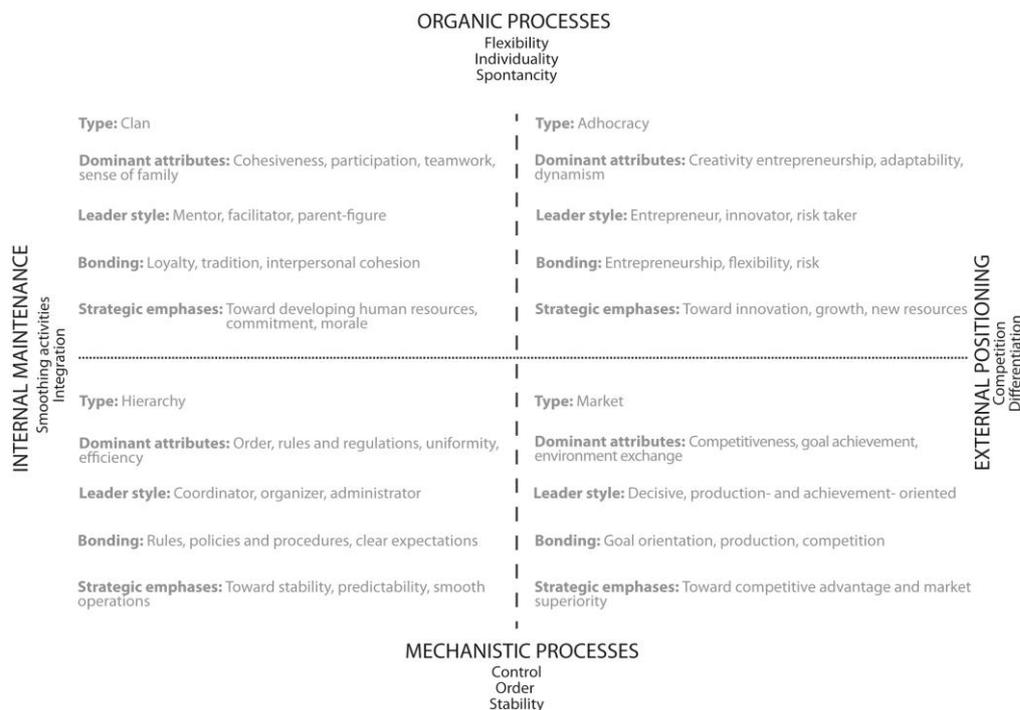


Figure 1. Types of cultures based on the work of (Cameron & Freeman, 1991).

Clan culture emphasises flexibility, and it is internally focused. Its characteristics are teamwork, employee participation and corporate commitment with employees. The adhocracy culture also emphasises flexibility and change, but it is oriented externally. Its key values are creativity, entrepreneurship and risk taking. A market culture seeks control and stability and is externally oriented. Its core values are goal achievement, consistency and competitiveness.

A culture of hierarchy also is oriented towards control but focuses on the internal organisation. Its key values are efficiency and close adherence to norms, rules and

regulations. An organisation rarely has a single type of culture; there is a mix of the four organisational cultures, but one of them is dominant.

ORGANISATIONAL CHANGE

As mentioned in the Introduction, there are some models dealing with the implementation of PBL as well as literature connecting PBL implementation with organisational change. According to some authors (Kolmos, 2010; Kolmos & De Graaff, 2007), each process of change to problem-based learning (PBL) is unique, and culture and contextual issues play an important role in the process and its results. Li (2013) explored the challenges and obstacles during the change to PBL in two universities and stated that, without a radical conceptual change in learning and knowledge for organisational members at the universities, the successful change to PBL was unlikely. Such change referred to the core values, beliefs and assumptions of the universities, which were the pillars of organisational culture.

Furthermore, organisational change literature shows culture to be a key element influencing the change process in organisations. It helps to identify readiness for change (Jones, Jimmieson, & Griffiths, 2005); it is necessary to cope successfully with change (Schein, 2010); it can hinder the implementation of initiatives with great potential (Patterson, 2000); and its deep understanding can facilitate the identification of appropriate change strategies.

Raj and Srivastava (2013) identified the effect of different types of culture on organisational learning and innovativeness. They demonstrated that adhocracy, market and clan cultures had a positive effect on organisational learning and innovativeness while the hierarchy culture had no positive effect. The adhocracy culture cultivated flexibility and creativity because its main goal was to adapt quickly to new opportunities. The market culture promoted organisational learning through the flow of information between internal and external constituents. The teamwork and employee development aspects of the clan culture fostered the proper utilisation of knowledge and improved learning and innovative capability. The hierarchy culture did not have an impact on organisational learning and innovativeness due to its characteristics, 'the employees do not have autonomy to perform the job... The formalised and centralised structure does not allow employees to approach the things from different and new perspective, therefore, does not provide opportunity to learn new things' (Raj & Srivastava, 2013, p. 215).

Suppiah and Sandhu (2011) also showed the influence of culture types on tacit knowledge-sharing behaviour. Clan culture was found to have a positive influence, while

both market and hierarchy culture types contributed negatively. In the same line, Biloslavo and Prevodnik (2010) found that clan culture, with its values of care for others and teamwork, was the most important type of culture for knowledge creation processes. Keskin, Akgün, Günsel and İmamoğlu (2005) also demonstrated that both adhocracy and clan cultures were considered crucial elements of tacit-oriented, knowledge management strategies, and that those type of cultures led firms to the effective implementation of tacit-oriented, knowledge management strategies.

De Long and Fahey (2000) argued that the importance of knowledge will change depending of the subcultures in the organisations because established group values and norms about what is relevant knowledge influences where the group focuses. They also stated that low trust cultures will constrict knowledge flow and organisations must rebuild trust levels in their culture before people start sharing expertise freely.

Summing up, from the literature, we dare to say that there is a need to study the organisational culture when an organisation is in the process of adopting PBL. As there is a change process taking place when trying to implement PBL, organisational change literature is needed to understand the process and to manage the change. Furthermore, a deep understanding of the specific organisational culture (where the change to PBL is taking place) will shed light on the level of change that must take place, and the core values that need to be strengthened or transformed. As knowledge creation, knowledge sharing and learning are necessary to support change, to know how these practices are done in the organisation is a key aspect to define the more appropriated PBL implementation plan in a given institution.

THE RESEARCH CONTEXT

The Universidad Nacional (UNA) since 2008 has had a pedagogical model that understands teaching and learning as a social, historical and cultural process that goes beyond the simple transmission of knowledge (Universidad Nacional, 2007). The model is based on constructivist principles in which the student is seen as the centre of the learning process. Further, it proposes an active and meaningful learning environment. As a model, however, it does not identify any specific teaching strategy, which means it is implemented in classrooms in a diversity of ways.

In the particular case of the School of Informatics (ISchool), the application of the pedagogical model depends on the nature of the courses and on the pedagogical knowledge of the faculty who teach the course. With the aim of providing students with a set of skills such as problem solving, effective communication, effective group work, professional responsibility and the capacity of lifelong learning, there have been in the

past 10 years two educational initiatives which seek to move the traditional pedagogical approach towards a PBL pedagogical approach. These two groups were working within the AAU model but with different levels of control by teachers and students.

Group 1: The IP group

The initiative to introduce PBL into programming courses was part of an institutional, exploratory research project in 2011–2014 aimed at integrating the principles of PBL from the early stages of the curriculum. In this group, the change towards PBL was seen as a gradual process mainly based on positive learning experiences for faculty and students. The pedagogical change was designed integrating the following principles of PBL (Mora, Coto, & Alfaro, 2014):

- **Problems as a stimulus for learning:** The starting point for learning was a problem related to situations familiar to the students. In general, teachers defined the problems.
- **Collaboration:** Students worked in groups to address learning activities. Each student was responsible for his or her individual performance, and positive interdependence was stimulated and complemented by a participatory evaluation.
- **Autonomy:** The students had to make decisions about some learning activities and assume a greater responsibility in the evaluation process.
- **Participatory evaluation:** Students used self-assessment and peer-evaluation strategies to reflect critically on their learning process and contribution to joint objectives.

From an internal organisation point of view, the group has a coordinator who establishes agreements regarding the subject content, learning activities and assessments. The role of the coordinator has been predominant, providing colleagues with clear guidelines about how to deliver the course and the teaching material to use in classrooms. The group is comprised of 10–12 faculty members, diverse in experience and age. Most are full-time staff, but about half do not have a permanent position at the ISchool. At the end of each semester, faculty members meet to share experiences and outcomes (Lykke, Coto, Mora, Vandel, & Jantzen, 2014).

The IP group faced some obstacles related to organisational issues, including the instability of faculty staff. The academic staff change from one semester to another, making it difficult to consolidate a group and achieve the objectives. Another obstacle was the lack of positive communication between faculty and difficulties in consolidating an effective group work. Finally, there was a lack of clear direction from the school

authorities regarding the change process towards PBL and the commitment of faculty staff to it (Mora et al., 2014).

Group 2: The SE group

In this case, the change towards PBL started as an initiative of the SE group with the goal of enhancing students' skills regarding the development of projects related to the industry. The SE group implemented the pedagogical approach through a sequence of three courses (1 1/2 years) in which the students must develop a software project in a real company. As such, they have the opportunity to choose the company and have more control over the problem to be addressed. These differences with the IP group are related to the nature of the courses and the maturity of the students because the IP students are in the first year of the program while the SE students are in their third year.

To implement PBL, the number of lectures in the courses have decreased and the supervision and workshop sessions have increased. The supervision sessions are about 30% of the first course, 40% in the second course, and 60% in the third course. These sessions emphasise best practices in project management and students' autonomy. Students work collaboratively during the three semesters and are responsible for formulating their own ethics code, resolving their conflicts, and presenting possible solutions to the problems that can arise. They also use strategies of self-assessment and peer assessment to promote responsibility and reflection (Sandoval, Cortés, & Lizano, 2015).

From an internal organisation point of view, the group has a coordinator who is the person with the most working experience at the ISchool. The group is comprised of 8–10 faculty members. They are balanced regarding experience and age: all have professional experience in the industry and most are part-time staff who do not have a permanent position at the school. An annual workshop is carried out to analyse learning activities, learning outcomes and their alignment with the PBL approach (Sandoval et al., 2015).

Regarding organisational matters, this group reported some challenges. To some extent, they had to work against the established institutional teaching norms to change the teaching structure. They also requested more clarity from school authorities regarding what the change to PBL means and the workload required. Finally, they felt vulnerable as a group because their conformation depended on the support of the authorities in turn.

METHODOLOGY

Two methods were used to collect data: a focus group and the Organisational Culture Assessment Instrument (OCAI). Both methods were applied to both the IP and SE groups. Table 1 shows the participants from each group. Eleven members of the IP group and 10 members of the SE group were invited; participation was voluntary. The only selection criterion was that they were part of the group at some point during the past 5 years.

	Focus group	OCAI instrument
IP group	3	8
SE group	5	5

Table 1: Research participants

The focus group

To learn about the organisational culture of each group, in relation with our understanding of this concept, we needed a qualitative method to provide inputs about group dynamics, values, traditions, process, work organisation, group assumptions and the level of adoption of PBL in their teaching practice. We chose to use a focus group, but integrated the Lego Serious Play (LSP) methodology (Kristiansen & Rasmussen, 2014) to facilitate the expression of emotions; promote cognitive, metaphorical and reasoning thinking; and foster storytelling. The LSP methodology ensures that all participants have time to participate. Following the principles of LSP, each participant had the opportunity to build, share and reflect about the different questions.

A focus group was carried out with each group. The main questions that guided the activity were:

- What is the regular structure of your classes?
- What are the group dynamics?
- How is the collaborative work between the group members?
- How is collaboration between ISchool faculty?
- What is the level of adoption of PBL in the teaching practice of the group?
- What have been the challenges to adopt PBL in the group?
- What would be the challenges to adopt PBL at the ISchool level?

Three people participated from the IP group and five from the SE group. The coordinators of both groups participated in the focus group. The focus groups lasted about 2 hours and were video recorded. We used Goldring's six traits of culture (2002) to analysis the focus group data and identify important shared patterns of meaning associated with vision, collaboration, tradition, decision-making, communication and innovation (see Table 2).

Trait	Description
Shared vision	Reflects the shared meaning developed through the history of the group. It is based on values and speaks about what is considered important and what kind of environment and relationships are promoted. It also includes leadership.
Traditions	Action, metaphors, symbols and ceremonies that make visible the values and assumptions.
Collaboration	When members work together to accomplish tasks. It considers the stated and tacit expectations about group behaviour and work.
Shared Decision-Making	The way in which a group makes decisions shows the values of the group. Formal and informal decisions translate values into actions.
Innovation	Includes dealing with changes that challenge existing assumptions and beliefs of the culture. This trait also refers to how groups dealt with changes and innovations.
Communication	The way the group expresses itself, including the emotions of its members. Communication supports the process of information exchange, problem solving, decision making, creating relationships and building practises, and it helps groups and individuals achieve their goals.

Based on Goldring (2002).

Table 2: Description of the six organisational culture manifestations

We analysed information from the focus group in two steps. First, two of the authors individually listened to and watched the video for each focus group, taking notes about data that informed the six traits of cultural manifestation and general aspects or comments that captured their attention. Second, they compared their notes and developed a description of each of the six traits as well as a consensus interpretation of the overall characteristics of each group and their level of PBL adoption.

The OCAI instrument

A second instrument were used to gather insight about each group's type of culture (if there was any difference). This was considered important because there exists literature relating the type of cultures with organisational change, organisational learning and knowledge sharing.

We used an organisational culture measure based on the Organizational Culture Assessment Instrument (OCAI; Cameron & Quinn, 2006). The OCAI helps uncover aspects of the organisation's culture that might otherwise not be identifiable or articulated by its members. It assesses six key dimensions of organisational culture: Dominant Characteristics, Organizational Leadership, Management of Employees, Organisational Glue, Strategic Emphasis and Criteria of Success. In each dimension are four descriptions that match with each of the four culture types in the model: adhocracy, clan, market, and hierarchy. For this study, the Management of Employees dimension was changed to Coordination Style, as it better reflected the nature of the 'management' in the analysed

cases. We used a version of the OCAI in Spanish; the standard OCAI instrument is available at http://my.ilstu.edu/~llipper/com435/survey_ocai_culture.pdf.

To complete the OCAI, individuals divide 100 points among four alternatives, depending on the extent to which each alternative is similar to the organisation (unit, department, group, etc.) under study. The idea is to give a higher number of points to the alternative that is most similar to the organisation (in this case, each group under study); thus, the participants provide a picture of how their organisation operates and the values that characterise it. The scoring of the OCAI was accomplished by averaging the response scores for each alternative. By averaging the individual OCAI scores, a combined profile of the organisation can be developed.

Table 3 presents the distribution of the survey. OCAI responses were anonymous so it is uncertain if the people who completed the questionnaire also participated in the focus groups.

Groups	Distribution	Rate of return
IP	11	8
SE	10	5
Total	21	13

Table 3: Survey distribution and responses

RESULTS

This section presents the results derived from the focus group and the OCAI instrument, relating the findings of both instruments.

Focus group

We can identify some organisational culture manifestations in each group, as well as the level of adoption of PBL. Regarding the adoption of PBL, the SE group has managed to adopt PBL into the teaching practice while the IP group is still struggling. Regarding the way they interact with and create meaning for the different daily activities, we can note that the SE group has a strong teamwork characteristic, supported by a participative leadership approach, healthy communication, an interest for continuous learning and a clear shared vision. Furthermore, the group highly values the friendship among its members. On the other hand, the IP group could be characterised as a function-oriented, highly professional group, with a strong and professional leadership, an orientation to work cooperatively rather than collaboratively, with a shared blurred vision and with mainly unidirectional communication. The details are shown in Table 4.

Categories	SE group	IP group
Shared vision	<p>The main motivation seems to be to develop the knowledge and skills that students should acquire for their future professional life. Several participants mentioned their happiness and satisfaction regarding seeing the professional growth of the students. They have a clear shared vision about how to achieve this goal and how they as a group can contribute. The use of <i>we</i> and <i>our</i> clearly expressed the sense of <i>we-ness</i> mentioned by Cameron and Quinn (2006). This frequent use of <i>we</i> provoked the feeling of a single voice and identity of the group. Another element that supported this shared mission was participants' history together and stories. They worked together for many years, and there were many anecdotes and stories to share.</p> <p>The type of leadership present was shown to be a key success factor. The members agreed that the leader was an open person who was willing to listen, make changes, value the human resources and motivate them to work.</p>	<p>The shared vision in this group was not as clear as in the other group. They had a vision, but it was a vision or a task given by the ISchool curriculum. As individuals, each was committed to student development and improving their teaching practise. However, the vision of the future they wanted to construct was not easy to interpret.</p> <p>The leadership of this group was more task oriented and less focused on a participative approach. When asked about how the group worked, the leader said 'dictatorial', meaning that she decided how things should be done. The other members replied, however, that it was a very organised and well-coordinated group.</p>
Traditions	<p>The group mentioned that they used to meet at the members' houses outside working hours and for birthday parties. They like this practise, as they got to know their colleagues' families. Some traditions were manifested as tales about the organisation and their members, thus creating a story. This trajectory as a group was present in the members and created pride.</p>	<p>There was no evidence of large traditions in the group. It seems that the frequent changes of members did not allow for the creation of a history or a common memory of the group.</p>
Collaboration	<p>From the description of their way of working, it seems as though the SE group worked collaboratively. While there was a division of tasks, the SE group put great effort into the creation of knowledge to improve their practise, and members kept in constant communication during the semester. There was a healthy environment for giving and receiving feedback.</p>	<p>Although the group seemed to work collaboratively in a collegial and friendly atmosphere, it was evident that their members were not ready to receive feedback from others regarding their knowledge or expertise. One participant shared a situation she faced weeks before the focus group took place. She recommended making some changes to an exam that two other colleagues designed. She made the recommendations with good intentions, but the feedback was not well received, provoking an internal group conflict.</p>
Shared decision-making	<p>The group was characterised as a more decentralised group in which the coordinator did not dictate how things should be done but promoted shared decision making. Decisions were more experience based and oriented toward knowledge sharing.</p>	<p>The group showed higher levels of control and concentration when making decisions than the SE group. The coordinator made many decisions to apply the PBL approach and designed many teaching activities.</p>
Innovation	<p>The group assumes changes and uncertainties as a learning opportunity. An integral part of its dynamics as a group is constant innovation. They were unafraid to introduce new approaches and initiatives,</p>	<p>Innovation is an important value for the group; each semester they look for new approaches for improving teaching practise. The initiatives often come from group leaders, however, and are presented</p>

	even when these went against some institutional rules.	as guidelines for other members to follow. They are very careful to frame these initiatives in institutional policies and rules.
Communication	Communication was informal and friend oriented. They communicated a great deal through email and had a WhatsApp group where they exchanged information, asked questions and made decisions. They also had face-to-face communication channels, such as coordination, planning and self-reflection meetings. One of the highlighted aspects in this group was their language. During the focus group, they often used words/phrases such as learning, humility, passion, love, teamwork and lessons learned. It seemed that they also were open to expressing their opinions and points of view, as well as their eventual lack of knowledge about some topics.	The group used email as the everyday communication channel and face-to-face meetings to coordinate, plan and evaluate, but this communication was more vertical than in the SE group. In other words, most of the emails contained messages from the coordinator to the members about issues that needed to be done to keep up with the scheduled learning activities. The discussion and exchange of opinions and points of view took place normally at the beginning and the end of the semester. The incident with the faculty member who provided feedback about the exam was an example of the way they communicated as it was not discussed or solved openly within the group.
PBL level of adoption	The participants affirmed that the PBL approach was very well established in the courses. Faculty members in the group were highly motivated and understood their role as facilitators. They defined themselves as a fragile group, however, as PBL was not an approach directly promoted by the ISchool; rather, it was their group's way of working. As challenges for a successful implementation of PBL, members pointed out aspects such as increased support from the authorities and a more balanced workload.	The group defined its level of adoption as 'individually adopted' because only certain faculty members who had experience with the approach were using it, and there were no new initiatives or policies to use the approach in the programming courses. The group pointed out aspects such as increased support from the authorities and a more balanced workload as keys to successful implementation of PBL. They also indicated the need to overcome some faculty members' resistance to change, a better collaborative environment and a general change of mentality at the ISchool.

Table 4: Focus group results

OCAI instrument

Scoring the OCAI requires simple arithmetic calculations. The first step is to compute an average score for each of the four alternatives (each related to one type of culture: adhocracy, clan, market and hierarchy), and then a mean score for each quadrant is calculated from the six dimensions. The higher the score, the more dominant the cultural type is (Cameron & Quinn, 2006). For example, Table 5 shows the data of the five participants of the SE group with respect to the Dominant Characteristics dimension. This dimension, like the other five, is composed of 4 items, where A corresponds to a value related to the Clan culture type, B to the Adhocracy culture, C to the Market culture and D to the Hierarchy culture. The results for this dimension show a high tendency to B (the Adhocracy culture).

	P1	P2	P3	P4	P5	Average
Dominant Characteristics						
A. The group is a very special place. It is like an extended family. People seem to share a lot of themselves.	25	10	10	10	30	17.0
B. The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	25	10	50	60	20	33.0
C. The group is very production oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.	25	40	20	20	30	27.0
D. The group is a very formalized and structured place. Bureaucratic procedures generally govern what people do.	25	40	20	10	20	23.0

Table 5: OCAI data for the SE group, Dominant Characteristics dimension

Table 6 shows the results of these calculations for each of the six dimensions, presenting the average values for the SE group. In this group, the dominant culture type was a clan culture (39.33 points), which means that basic assumptions and values of the clan culture predominate in the SE group and that most members saw the group as a friendly place where they shared a great deal about themselves. This was supported by the data from the focus groups where they referred to their shared histories and traditions, and the time that they spent together getting to know each other and their families. In this sense, the SE group was held together by a mix of components, such as shared vision, loyalty and traditions.

A clan culture places a strong emphasis on the long-term benefit of human resource development and attaches great importance to cohesion and morale. These traits could be perceived in the SE group’s work methods, the willingness of the members to learn together and the emphasis placed on consensus and shared decisions.

Dimension	Type of culture			
	Clan	Adhocracy	Market	Hierarchy
Dominant Characteristics	17.00	33.00	27.00	23.00
Organizational Leadership	22.00	20.00	26.00	32.00
Coordination Style	56.00	22.00	10.00	12.00
Organisational Glue	44.00	24.00	22.00	10.00
Strategic Emphasis	48.00	28.00	9.00	15.00
Criteria of Success	49.00	21.00	8.00	22.00
Average	39.33	24.67	17.00	19.00

Table 6: OCAI results of the SE group

From Table 6 we also can see that there is a well-marked difference between the culture that obtained more points (clan) and the culture next highest in points (adhocracy). The higher the difference between the different types of cultures, the stronger the culture. A strong culture corresponds with a clear sense of direction, homogeneity of efforts, an unambiguous environment and services.

Next we calculated the results for the IP group. As shown in Table 7, this group was operating as a hierarchy culture, with 31.56 points, but almost equally as a clan culture, with 28.23 points.

Dimension	Type of culture			
	Clan	Adhocracy	Market	Hierarchy
Dominant Characteristics	26.88	28.75	18.13	26.25
Organizational Leadership	17.50	17.50	28.13	36.88
Coordination Style	35.00	14.38	25.00	25.63
Organisational Glue	30.63	15.63	13.75	40.00
Strategic Emphasis	27.50	33.75	11.88	26.88
Criteria of Success	31.88	25.63	8.75	33.75
Average	28.23	22.60	17.60	31.56

Table 7: OCAI results of the IP group

The IP group has a mixture of cultures in which the emphasis is on procedures and planning. The high values for hierarchy show that IP group members largely perceive the way they work and interact within the group as being determined by a set of rules and procedures that told them what and how to do their work, with a strong emphasis on values like control, efficiency, consistency and uniformity. Evidence of this situation was found in the focus group in which participants affirmed that the group worked in an orderly and organised way, and that they had clear guidelines (given by the coordinator or leader) for how to deliver the course. It was very important for the IP faculty members and coordinator to look for uniformity in the different classroom groups.

In a hierarchy culture, it is also possible that within the group, many of the members are not used to being responsible and to playing a critical role in the decision-making process. The focus group also revealed traits like this in which it was evident that all decisions are finally made by the coordinator.

The proximity to the clan culture can be understood in the collegial and friendly atmosphere among the members and the interest in teamwork and empowering faculty staff to learn and implement PBL in their classrooms.

Comparison of the SE and IP groups' results

We further examined organisational culture by analysing the six dimensions of the OCAI instrument. Table 8 presents the dominant type of culture for each group in each dimension.

	SE		IP	
	Dominant culture	Average value	Dominant culture	Average value
Dominant Characteristics	Adhocracy	33	Adhocracy	28.75
Organisational Leadership	Hierarchy	32	Hierarchy	36.88
Coordination Style	Clan	56	Clan	35.00
Organisational Glue	Clan	44	Hierarchy	40.00
Strategic Emphasis	Clan	48	Adhocracy	33.75
Criteria of Success	Clan	49	Hierarchy	33.75

Table 8: OCAI results by dimensions

Congruence on the six aspects means that all the dimensions are based on the same values and fall into the same cultural quadrant. According to Cameron and Quinn (2006), research has shown that successful organisations often have a congruent culture because having all aspects of an organisation focused on the same values and sharing the same assumptions reduces the obstacles to achieving goals effectively. From Table 8, we can see that the SE group can be categorised as a more congruent culture than the IP group, which shows no particular pattern of similarity.

Analysing the data in Table 8 in greater detail, we can see that there are no differences between groups in the three first dimensions. For the Dominant Characteristics dimension, both groups have the adhocracy culture, which means that both subcultures are dynamic and willing to take risks. The SE group was slightly higher in this aspect, however, which is congruent with the information obtained in the focus group where members described the how they responded when they felt threatened by some authorities, showing that they are good at fostering adaptability, flexibility and creativity in uncertain and ambiguous situations.

For the Organisational Leadership dimension, both groups showed a hierarchy culture, which means leadership is considered as a way to exemplify, coordinate and organise. In this dimension, the score for the IP group is higher than the score for the SE group. This again is consistent with the focus group results which showed that leadership in this group was perceived as a more 'dictatorial', and more task and results oriented than in the SE group.

In the Coordination Style dimension, both groups have clan culture, which means that group coordination is characterised by teamwork, consensus and participation. The difference between the two scores, however, is the highest of all dimensions. This result was clearly perceived in the focus groups in which members of the SE group stated that the leader or coordinator was an open person who was willing to listen, motivate them to work and promote shared decision making. On the other hand, data from the IP group showed higher levels of control and concentration of decisions in the coordinator. Therefore, even when both groups share the same type of culture, differences in their scores are clearly manifested in group behaviour.

The Organisational Glue dimensions indicated that for the SE group, the key aspect that keeps their members together is mutual trust, while for the IP group, it is formal rules and policies. This result is congruent with the information given in the focus groups regarding shared vision, collaborative approach to work and traditions.

The results from the Strategic Emphasis dimension reinforce that the SE group has a focus on members' development, trust, openness and participation, while the IP group shows a tendency to try new things and create new challenges. Regarding the Criteria of Success dimension, the OCAI data indicate that the SE group defines success based on human resources, teamwork and commitment, but for the IP group, the most important success indicator is efficiency. These results were supported by the focus group data and the process each group followed to implement PBL.

Given the theoretical and empirical research on PBL (Barge, 2010; de Graaff & Kolmos, 2003; Li et al., 2009; Savery, 2006), it can be argued that the PBL principles are collaboration, self-directed learning, trust, respect, team building, ownership, engagement, interdependence and critical thinking. When analysing the previous principles and the theory about types of organisational cultures (Cameron & Quinn, 2006), it may be concluded that the PBL principles are more aligned with the characteristics of clan and adhocracy cultures. Furthermore, between the two, clan culture is even closer to PBL principles, as in both there is a strong emphasis on collaboration, teambuilding and human development. This theoretical inference is supported by the empirical data; the culture manifestations of the SE group seem to be closer to the principles of PBL, and this group is also more aligned with a clan culture. Therefore, it can be concluded that, in our research context, PBL principles are more closely connected to the clan type of culture.

How does Organisational Culture Influence the Process of Changes towards PBL?

The research question establishes a relationship between organisational culture and the successful implementation of a PBL pedagogy approach in a traditional higher education institution. We found two implications of organisational culture in the PBL implementation process. The first refers to the extent to which a particular culture is aligned with PBL principles (desired culture), which in turn defines the required level of change. The second aspect relates to the way in which a particular culture better supports organisational learning and therefore organisational change towards PBL.

Regarding the first aspect, as both groups aimed to use PBL as a pedagogical approach, the key principles of PBL were compared with each group's organisational culture. The data show that the SE group has culture manifestations that better match the PBL principles than the IP group. In this sense, the adoption of PBL by the SE group should be smoother and quicker. For the IP group to implement PBL, the level of change is more significant, as the group would need a greater reinterpretation and reconstruction in their beliefs, values and behaviours. The construction of new meanings, interactions, artefacts and shared language that are not part of their current organisational identity is necessary. It is important to understand, however, that the adoption of PBL does not mean that the current cultural manifestations are going to be totally abandoned but reinterpreted and modified to support the new way to understand teaching and learning (in other words, PBL). In this sense, a movement from the IP group towards a more PBL pedagogical practice means more empowerment of their members, more participation and involvement in decision-making, and more effective teamwork. It does not mean a lack of coordination or failure to follow ISchool policies and rules.

With regard to the second aspect, we refer to an organisational culture that supports learning and change processes. When PBL is implemented, it is a fact that the change will take place. The alignment between the current culture and the desired culture will determine the required level of change. Another important factor to consider, however, is if the type of organisational culture present in a particular group or organisation favours processes of learning and change.

We can state that both groups have a strong orientation to change and learning. The decision to implement PBL was a product of a reflection process about how to improve their university teaching practice. The SE group has been involved in a continuous process of promoting organisational growth by questioning all organisational practises, even their own teaching practises, and this promoted an awareness and willingness to change beliefs and values. On the other hand, the IP group has been struggling to adjust PBL to its current values, rules and practices.

From analysis of the data, we can conclude that the SE group has a culture that better promoted organisational learning, innovativeness, knowledge creation and sharing than the IP group. As the OCAI shows that the SE group has a clan culture, this conclusion is supported by empirical work presented previously (Biloslavo & Prevodnik, 2010; Raj & Srivastava, 2013; Suppiah & Sandhu, 2011). As Cameron and Quinn (2006) stated, strong cultures have the needed conditions to face a change process, such as clear focus and common vision, while congruent cultures contribute to facilitating change and reduce the obstacles to achieve goals effectively. The SE group has both a strong and a congruent culture. In other words, if the ISchool decides to implement PBL, the SE group is more prepared for it. There already are group values, such as trust, teamwork, organisational learning and a culture of knowledge sharing, which the literature associates with key factors for learning and change processes.

CONCLUSIONS

The aim of this paper was to provide a general view of the main interconnections between organisational culture and the process towards PBL. When we considered the organisational theory literature, we identified the connection among organisational culture, organisational change, learning and change readiness. Understanding the organisational culture will assist in the process of understanding why organisations respond in a certain manner to the implementation of PBL. The different understanding of organisational culture will influence how to approach a PBL implementation process.

Within a variable approach, the understanding of organisational culture may support the process of creating readiness for implementing PBL as well as facilitating the management change process that needs to take place. Within the metaphor approach, the understanding of organisational culture sheds light on rethinking who the group is as an organisation; redefining organisational identity; and reinterpreting and reconstructing their beliefs, values and behaviours. Aligned with the metaphor approach and within our understanding of organisation culture – which considers PBL to be a learning philosophy and not only a pedagogical approach – we mean the PBL implementation process needs a construction of new forms of interaction, and creation of knowledge, joint work and meaning making. In other words, the organisation must go through a process of reification of values, beliefs and assumptions into a new organisational practice.

This study adds to Li, Du and Stojcevski's (2009) model of organisational culture as the centre of the PBL implementation process. The research used concrete instruments and empirical data to understand the cultural traits that must be fostered to move towards PBL and how the different understandings of organisational culture influence the approach to this process.

The research is limited to two small groups within a university faculty, and it should be taken as an exploratory study regarding the findings. Therefore, future research should be directed towards collecting and analysing data regarding organisational culture across a greater number of departments or universities to develop more empirical evidence on the influence of organisational culture and the implementation of PBL. It also is important to develop research on the general dimensions of organisational culture that correspond to the values and beliefs underlying PBL.

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