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Knowledge management framework to the university libraries

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Abstract

Purpose – The purpose of this paper is to propose a knowledge management framework for university libraries (named GC@BU). The framework consists of three modules: knowledge management coordination; knowledge resources; and learning commons, and uses as theoretical assumptions the design of an university library (developed for the context of the framework), the standards for libraries in higher education of the Association of College and Research Libraries (ACRL) and the characterization of the university library as a complex adaptive system (CAS).

Design/methodology/approach – This framework was structured by a literature review and based on models, methodologies and existing frameworks, being afterwards evaluated through focus groups composed of managers of university libraries, resulting in an enhanced version.

Findings – After evaluation, the GC@BU framework showed to be easy to apply in the context for which it was created (university libraries). It is noteworthy that in addition to the knowledge management application, the GC@BU reinforces the importance of concerning for the quality and the services, since it uses as a parameter the standards of the ACRL. In addition, the perspective used to characterizing university libraries (as CASs) was well accepted by the tool evaluators.

Research limitations/implications – The proposed framework is focussed on university libraries, but its use in other contexts should not be dismissed as long as the manager makes the necessary adjustments for this purpose.

Practical implications – Since knowledge management is an intangible element, its application and benefits are not easy to conceive. This tool provides the implementation of knowledge management in university libraries, and knowledge is considered from different approaches (from the user, the collaborator, the library collection). Besides, the tool is arranged so (in modules and verification criteria) as to allow the manager to administer the library as a whole, from the point of view of knowledge management.

Originality/value – This study is considered innovative and applicable on the global stage of university libraries, because despite being evaluated by Brazilian managers it uses international standards and has a strong ability to adapt to different contexts.

Keywords Knowledge management, Framework, University libraries, Librarian,
Complex adaptive systems, GC@BU

Paper type Research paper

1. Introduction

Knowledge management in libraries can be characterized as a built-in activity, since they have as a basic premise to store and share information. However, there are few frameworks which have characteristics that allow the implementation of knowledge management, as well as its theoretical understanding. Therefore, this paper, as the result of a doctoral thesis and a partnership between the doctoral student and her advisor professors, presents the GC@BU framework which aims to assist the

university libraries in the implementation of knowledge management for various purposes (the user, collaborator, the library collection, etc.).

GC@BU stands for *Gestão do Conhecimento na Biblioteca Universitária* in Portuguese, which translates as "Knowledge Management at the University Library." The GC@BU framework consists of three modules (knowledge management coordination, knowledge resources and learning commons[1]) and three theoretical assumptions, as shown below.

To confirm the potential applicability of the tool, it is worth mentioning that it is currently being implemented within the Library Systems of the Federal University of Santa Catarina, Brazil. In order to remain competitive and combined to the benefits that the knowledge management can provide, the adoption of the framework brings the necessary systematic for planning, development and evaluation of these initiatives (Bem *et al.*, 2016).

2. Theoretical assumptions of the GC@BU framework
In order to build a framework, it is necessary to have a solid theoretical foundation to support it, especially if the intention is to define a conceptual field, as well as directions to practical use. This way, we consider the university library as a complex adaptive system (CAS) (Section 3.1), regarded as a complex institution. The GC@BU framework is also supported by specific standards for university libraries (Section 3.2). In this case we relied on standards defined by the Association of College and Research Libraries (ACRL), ACRL (2011), which also helped determine the verification criteria for the elements of each framework module, while those modules were inspired from the concept of university library (Section 3.3) developed for the context of the GC@BU framework.

2.1 University libraries as CASs
When developing the framework, we considered that complexity must be fully taken into account when dealing with libraries and consequently with knowledge management. It should be considered in the context of creation, processing, sharing, dissemination and use of information and knowledge, i.e., in the knowledge management as a whole, involving activities spread through the library.

Therefore, this framework presupposes understanding the university library from the perspective of CASs. The focus of the adaptive systems is related to the approach proposed by Axelrod and Cohen (1999) and its operating procedures (variation, interaction and selection). The CASs approach was used to understand the knowledge management given the need of a comprehensive approach to reach the university library as a whole, involving all employees, resources, purpose, etc.

2.2 Standards from the ACRL
The proposal of GC@BU is to create opportunities for university libraries to achieve knowledge management without forgetting the importance of the excellence of its services, always aiming for user satisfaction and continuous improvement. For this purpose, in addition to applying knowledge management in university libraries with the approach of the CASs, the goal is to include quality standards in services for university libraries. Therefore, we used the principles established by the Association of College and Research Libraries (2011) with their respective indicators. The nine principles (institutional effectiveness, professional values, educational role, discovery,

collections, space, management/administration, personnel and external relations) and their respective indicators are included in the three modules of the GC@BU framework.

2.3 The concept of university library in view of knowledge management

The literature and the practice itself of university libraries bring different concepts and approaches regarding the performance of university libraries toward knowledge management. However, we have adopted an underlying concept of knowledge management for university libraries, used for the context of this framework – it is the process of creating, acquiring, sharing and applying the tacit and explicit knowledge for the benefit of the university and all its community of users, by providing the right information to the right customer, on time and with the appropriate format, in order to achieve the goals of the institution (Jain, 2013).

Figure 1 illustrates the concept used in this research about what is considered to be the role of the university library in view of knowledge management. Systematized in this figure, the mental map displays and connects the different approaches of university libraries conceived by various authors.

The idea is to show that the university library in knowledge management should be aware of various aspects, instead of restricting itself to the knowledge produced by its institutions or to providing an appropriate environment for knowledge creation and sharing. Its role should devise a more global presence, since knowledge management is a process that should involve the entire organization and all its employees, instead of being limited to certain people or processes and activities.

Some authors report that university libraries in view of knowledge management have the function of: managing knowledge from the construction and management of repositories, for example (Miranda, 2010); providing learning facilitator spaces (Carvalho, 2004); providing access to knowledge and teaching users how to find resources that support their studies; creating and managing customer knowledge (Daneshgar and Parirokh, 2012), among others. However, we believe that the university library may have a more global role even without fixed determinations, because after all we are working with a changing context, in which the university library is designed as a CAS, illustrated in Figure 1 as balloons with suspension points.

Note that the roles that the university library develop, represented in the mental map, are grouped by color. These colors attempt to bring together functions in major areas: knowledge resources (blue); spaces (physical and virtual) for knowledge creation and sharing (orange); and managerial aspects (green). This also helps model the premier resorts of the modules of the proposed framework. Each served as the basis for modeling the GC@BU, which will be presented as follows.

3. Construction methodology for the GC@BU framework

The GC@BU framework was structured based on studies and authors, as well as theoretical assumptions. From literature review (item 3 in Figure 2) some authors (item 4) were used as a guide for the development of certain aspects of the framework; the GC@BU began to be developed according to their approaches. The initial version of GC@BU (item 5) was analyzed by focus groups (item 6), and their suggestions guided the development of the final version of the GC@BU framework (item 7). Figure 2 shows the progression of development, which represents the framework construction stages, in order also to clarify it for future users – the university libraries managers.
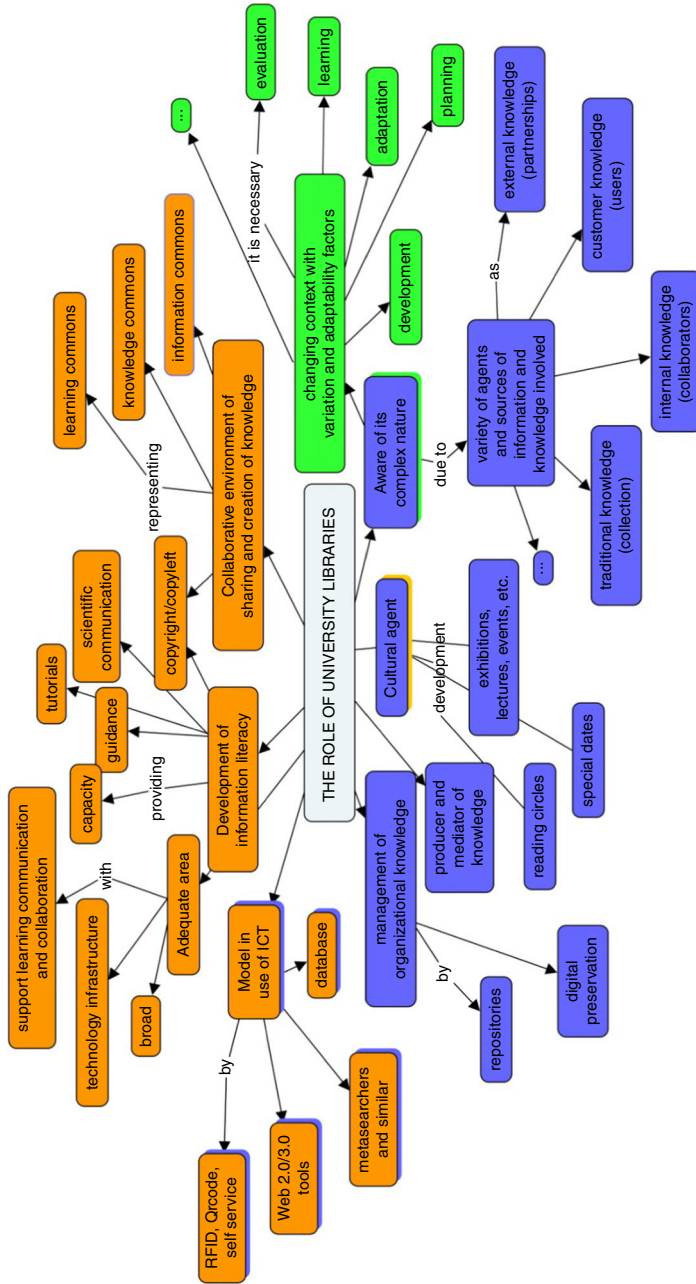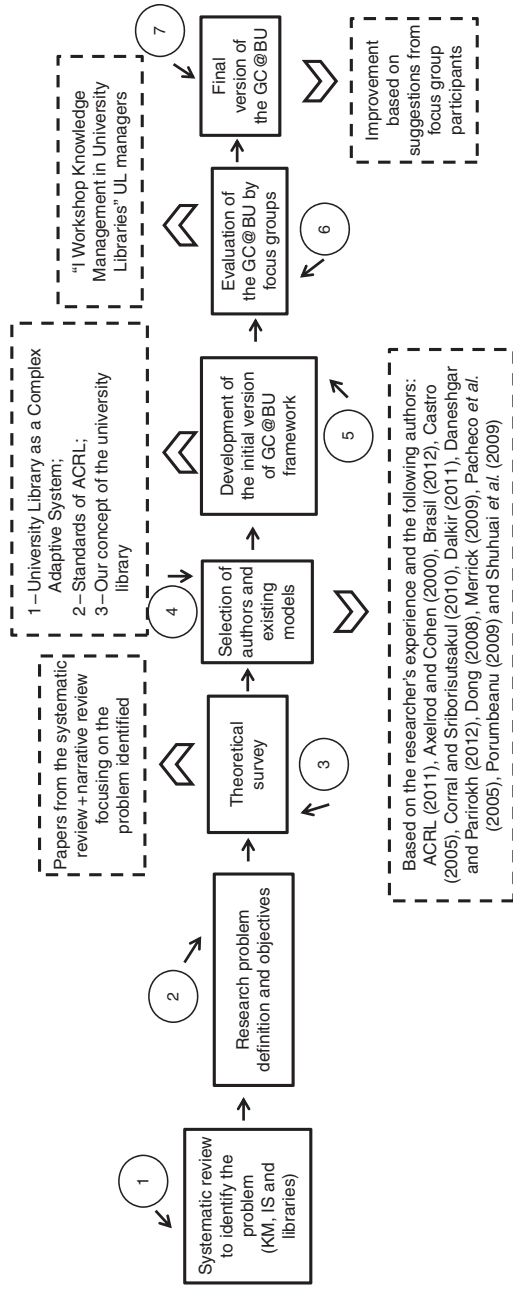
Figure 1.
The concept of
university library in
view of the
knowledge
management

Source: Bem (2015, p. 169)

Source: Developed by the authors (2015)

Figure 2.
The framework
construction steps

Step 5, the development of the initial version of the framework, is thoroughly explained in Figure 3, which shows the composition of the GC@BU starting from their theoretical assumptions until the definition of modules and their respective verification criteria.

As mentioned above, the GC@BU has a background (in gray) that represents the perspective of CASs employed, and also uses the standards of ACRL (in beige) as a guide to the maintenance of service standards in university libraries, besides the three modules.

From the notion of university library in view of knowledge management used in this research, three groups emerged, resulting in what we call modules (knowledge management coordination, knowledge resources and learning commons). Then it was necessary to define which elements would be part of each module, so based on readings – models, methodologies and frameworks of knowledge management, in addition to the ACRL standards – adjustments were made to insert into each module the elements that could represent them.

Subsequently, since the GC@BU proposal envisions applications to the practical use, we needed something more tangible to the framework in order to enable guidelines for implementation; therefore, it became necessary to define sets of criteria that would allow the adequacy and design of the university library according to each element.

3.1 Evaluation procedures: focus group analysis

For the evaluation of GC@BU we relied on qualitative research, in this case represented by the focus group technique. Such evaluation was created from the experience of managers of Brazilian University Libraries, so that each small group evaluated the GC@BU framework altogether with its three modules.

These evaluations took place during the "I Workshop Knowledge Management in University Libraries" in which the framework was submitted for evaluation by 80 managers of Brazilian University Libraries. The event was organized by the author of the thesis which originated this paper, together with a team appointed by the University Library of the Federal University of Santa Catarina (UFSC), which promoted the event in partnership with the Postgraduation Program of Engineering and Knowledge Management at UFSC. The workshop took place on August 6 and 7, 2014 at UFSC, Brazil. Its program concentrated in applications and knowledge management projects for university libraries, so that in addition to their work experience managers could rely on a theoretical framework to support their knowledge when evaluating the proposed framework.

Thus, the initial version of GC@BU was modified in order to consider the points raised in the evaluation by focus groups, among them: a new GC@BU design; the inclusion of two columns on the table of indicators, which then began being called verification criteria, as to signal links between the elements and score the levels of criteria; spelling adjustments and inclusion of examples to facilitate the visualization of GC@BU. The focus group participants showed enthusiasm in learning about the framework and availability to implement it. In Section 5 the GC@BU is presented in its final and complete version, with the proposed modifications and a brief description of the modules[2].

4. Final version of GC@BU

The final version (Figure 4) presented in this section takes into account the improvements implemented, based on the evaluation by focus groups.
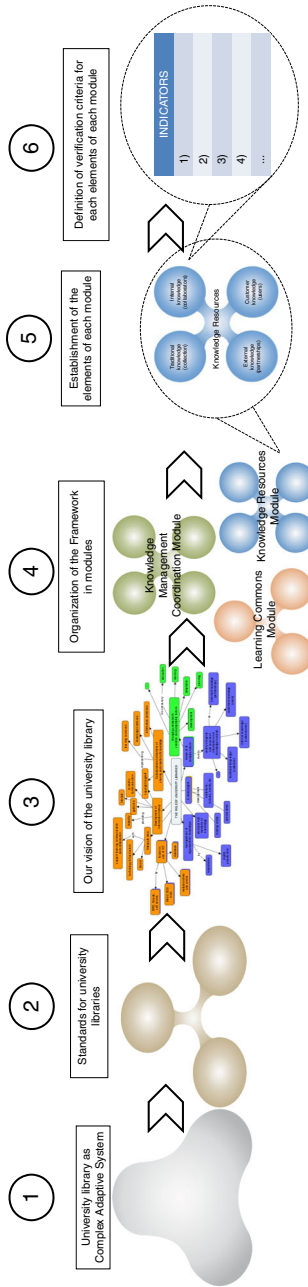
Source: Developed by the authors (2015)

Figure 3.
Composition of the
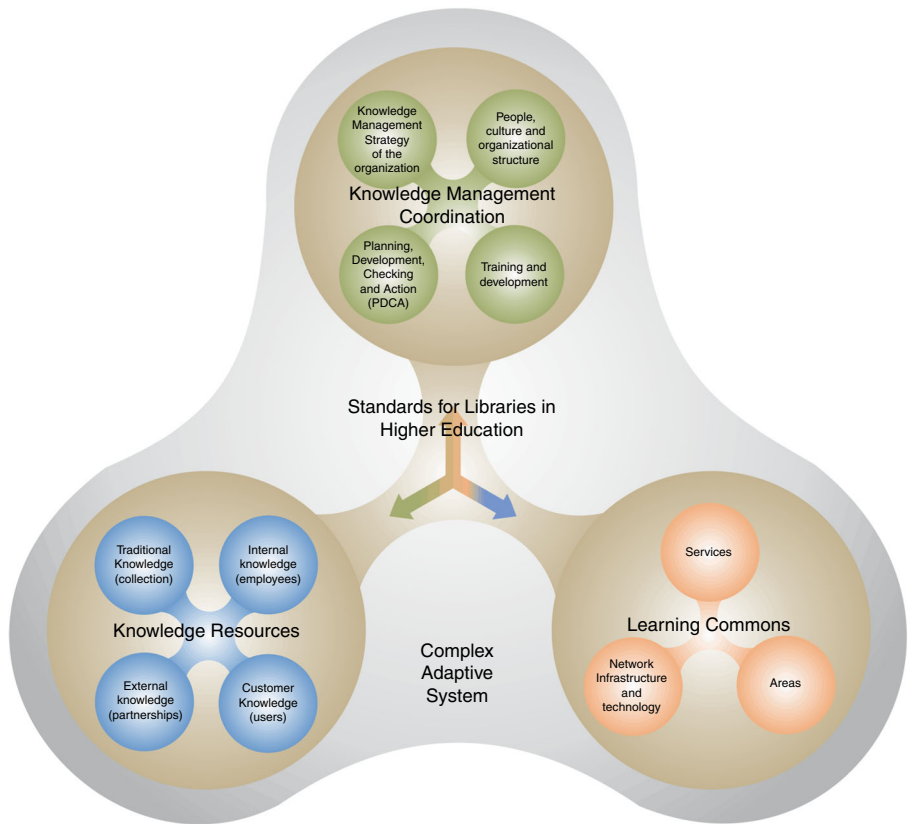modules and
verification criteria

Figure 4.
Final version of the
knowledge
management
framework for
university libraries:
GC@BU

Source: Bem (2015, p. 204)

Confirming the adaptability feature of the GC@BU, although there are three standard modules (knowledge management coordination, knowledge resources and learning commons), the component parts can be altered according to changes in their demands, adapting to the environments of the institutions using them. The following sections present the details of each module and of the CASs perspective, bringing contributions for practical implementation.

4.1 Applying the CASs perspective in the university library

In this section, we briefly present the characterization of the university library as a CAS. Figure 5 shows the elements that are included in this way of observing the university library as a CAS. The idea is to act on four fronts of the university library – in its recognition, focussing on agents as main elements; and the processes of variation, interaction and selection.

This way of conceiving the university library (as a CAS) is based mainly on questions made by Axelrod and Cohen (1999) – who provide a plan for the user who wants to manage complexity in a system, helping them in the field of complexity of a particular system. However, we tried to translate and adapt
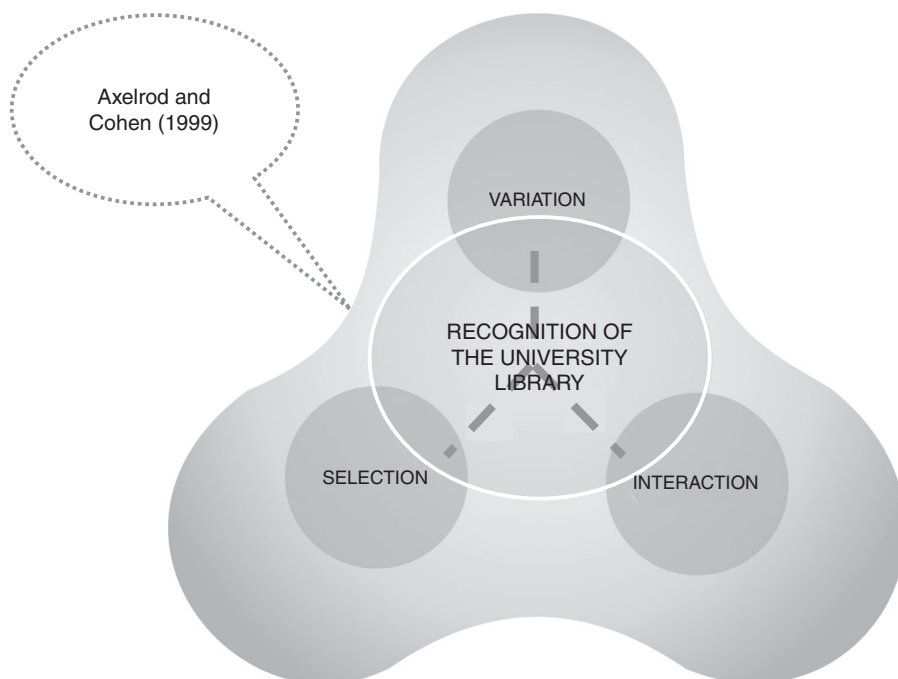
Source: Bem (2015, p. 206)

to the reality of university libraries with more conventional expressions and examples associated with practical use.

4.2 Knowledge management coordination module
We defend the idea that a person or department responsible for knowledge management in the library is of paramount importance to the success of the initiative. The creation of a knowledge manager post such as a "Chief Knowledge Officer" greatly increases the chances of successful implementation of this new resource in libraries and information services (Porumbeanu, 2009).

The knowledge management coordination module is based on various authors (Porumbeanu, 2009; Castro, 2005; Shuhuai *et al.*, 2009; Pacheco *et al.*, 2005) and in the principles of institutional and management/administration effectiveness from the Association of College and Research Libraries (2011), as shown in Figure 6.

Coordination of knowledge management includes everything that constitute the organization's knowledge strategy. In general, it is responsible for the proper functioning of the knowledge management process within the library or the information service sphere. It coordinates the preparation and implementation of programs and knowledge management systems, finds new sources of knowledge, identifies new ways of effective use of knowledge in the organization, among other functions (Porumbeanu, 2009).

From our point of view, knowledge management coordination does not need to rely in just one person, one sector or one job post. It can be represented by a committee, by the vice-direction or even by the direction of the university library,
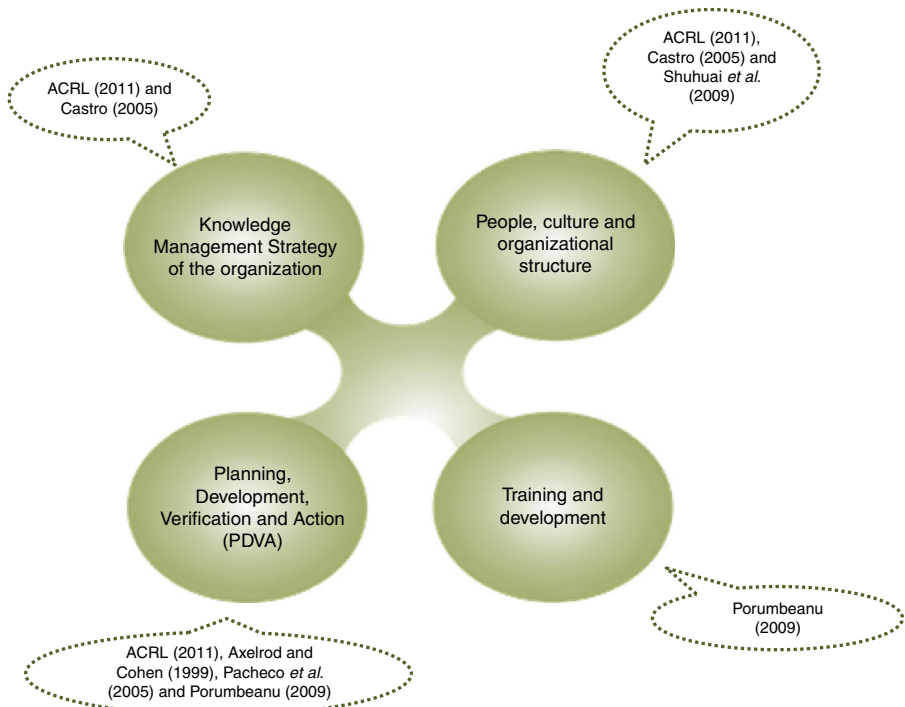
Figure 6.
Knowledge
Management
Coordination Module

Source: Bem (2015, p. 219)

because the activities on this module are managerial and intrinsic to the administration of the university library; and if they are not done by this department, they should be developed by a group. The important thing is that while knowledge management is not sufficiently ingrained among all people and services so that it can be naturally carried on, there should be "someone" responsible for this particular concern.

Thus, knowledge management coordination module (Figure 6) is guided by the organization's knowledge strategy (Association of College and Research Libraries, 2011; Castro, 2005), by the management of people, culture, and organizational structure aspects (Association of College and Research Libraries, 2011; Castro, 2005; Shuhuai *et al.*, 2009), by training activities of staff (Porumbeanu, 2009), and by planning, development, verification and action (Association of College and Research Libraries, 2011; Axelrod and Cohen, 1999; Pacheco *et al.*, 2005; Porumbeanu, 2009) of the whole process of knowledge management, always recognizing the university library as a CAS.
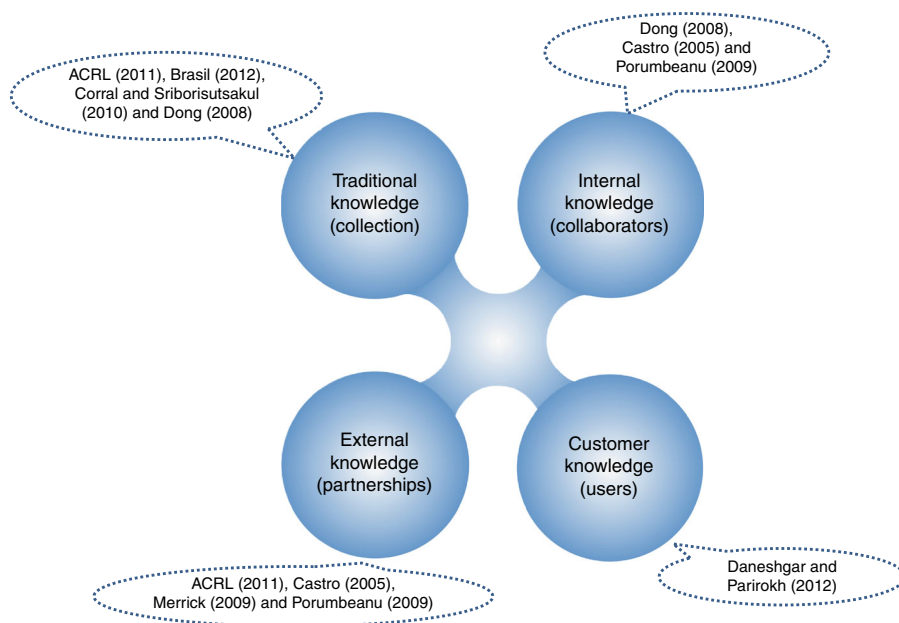
4.3 Knowledge resources management
The knowledge resources module is the GC@BU framework module that represents the essence of the university libraries and their primary purpose, which is to provide information and knowledge to users in many different formats and through various services.

To be able to work the knowledge resources, which must be taken into account in a university library, we need to establish an approach to the knowledge management cycle. In other words, to define which knowledge processes should be adopted. The integrated cycle of knowledge management of Dalkir (2011) was used to understand the development of this module, which involves the steps of capture or creation of knowledge; sharing and dissemination of knowledge; and acquisition and application of knowledge.

Whereas knowledge management is only effective when it can cover the broadest possible range of existing knowledge in the organization, minimizing the most barriers of any kind (technological, behavioral, financial, etc.), the knowledge resource module comprehends the three steps mentioned (creation and/or capture, sharing and dissemination, acquisition and application), which will focus on four categories of knowledge defined as: traditional library knowledge (library collection); internal knowledge (collaborators); customer knowledge (users); and external knowledge (partnerships), as shown in Figure 7, based on the following authors: Association of College and Research Libraries (2011), Dong (2008), Ministério da Educação (BRASIL) (2012), Corral and Sriborisutsakul (2010), Dong (2008), Castro (2005), Porumbeanu (2009), Daneshgar and Parirokh (2012), Association of College and Research Libraries (2011), Castro (2005), Merrick (2009), and Porumbeanu (2009), respectively.

4.4 Learning commons/learning/knowledge spaces module

University libraries as coordinators of knowledge construction go far beyond physical spaces; they need to integrate a number of elements that can give the necessary support to the construction of knowledge, following the premise of knowledge

Source: Bem (2015, p. 233)

Figure 7.
Knowledge
resources module

management (noticing that knowledge creation is just one of the stages of knowledge management cycle, which is an ongoing and interconnected process that will support the others in a complex whole).

The learning commons module is based on the principles of learning commons, "an evolution of the term information commons," which has been used to designate the spaces developed with the purpose of producing knowledge and learning – a notable feature of modern libraries – in order to support a more interactive learning model. The "learning commons" are being studied in the context of university libraries as spaces that integrate a number of elements, considering physical and virtual aspects associated with the network infrastructure and technology, besides services and skilled human resources.

Thus, the learning commons module consists of three dimensions: services (Association of College and Research Libraries, 2011; Shuhuai *et al.*, 2009); spaces (Association of College and Research Libraries, 2011; Shuhuai *et al.*, 2009); and network infrastructure and technology (Association of College and Research Libraries, 2011; Castro, 2005; Shuhuai *et al.*, 2009), as shown in Figure 8.

The approach of Shuhuai *et al.* (2009) discusses the knowledge commons, in which are considered the physical, virtual and support layer. Our approach considers all of these elements, but with some adjustments. The physical layer is represented by "spaces" associated with another element, "infrastructure of networks and technology," the latter also including the virtual layer mentioned by Shuhuai *et al.* (2009). From the support layer we use the concept of "people management," since "culture, values and organizational structure" are included in "Knowledge Management Coordination Module." Complementing the Shuhuai *et al.* (2009) approach on support aspects, we use some requirements from Castro (2005) on organizational support, involving: people management; organizational structure; information technology.

5. Conclusion
Considering the GC@BU in all aspects, it is possible to perceive it a consistent model; despite having three distinct modules, they relate and complement each other
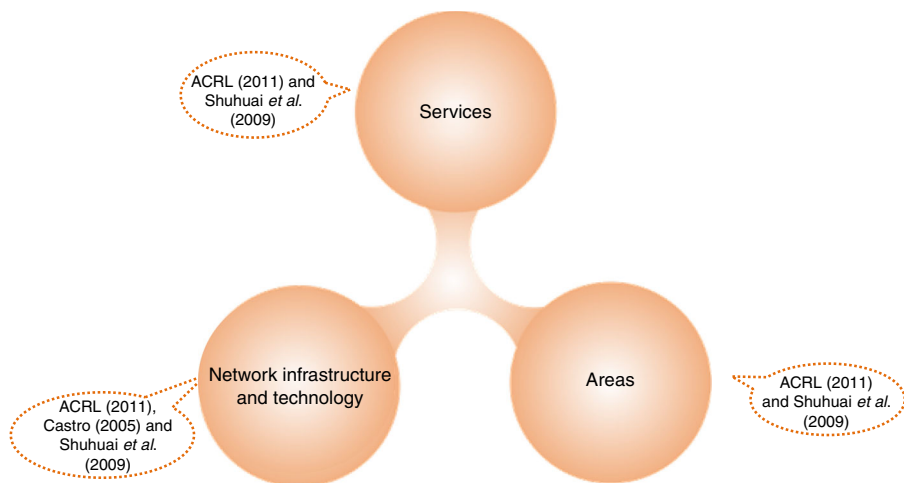

Figure 8.
Learning commons module

Source: Bem (2015, p. 250)

adequately, based on norms and standards for university libraries and ensuring excellence in services.

Also, conceiving university libraries as CASs gives the framework a grip on reality, as the environment in which these institutions operate is characterized by changes and instabilities. This feature was reaffirmed by the managers of university libraries during the qualitative research. Also, the GC@BU background that exemplifies the characterization of the university library as a CAS shows that, in addition to being a style of management, it systematizes the university library for using the framework, as it identifies agents, artifacts, processes, environments and other elements. When those elements are unknown, the implementation of a knowledge management tool such as GC@BU is severely limited.

Furthermore, different authors (Yang and Liu, 2009; Alves, 2006; Crossan *et al.*, 1999) mention steps or features of a successful framework which can be seen in the GC@BU, such as: observation; interpretation; transformation; verification; clear identification of the phenomenon of interest; indication of key assumptions or assumptions underlying the framework; description of the relationship between the elements; consistent language, presentation and description of processes; control table; attention to non-technical factors, etc. All these elements confirm the relevance and consistency of the framework.

In conclusion, we can infer that the GC@BU framework is academically and technically well supported, given the way it was designed and the characteristics that define it. GC@BU was developed from observation and technical expertise, as well as scientific sources. It was evaluated by a group of university libraries managers and then "transformed," resulting in a final, enhanced version. There are three underlying theoretical principles (the ACRL standards, the design of university library and the perspective of a CAS) which are conceptually well supported, even including the support of a glossary; it has verification criteria that support its practical implementation and also demonstrate the relationship between modules and other criteria[3].

In order to confirm the application potential of GC@BU, the Library System of the Federal University of Santa Catarina (UFSC) is employing it. It is currently at the stage of "Recognition of the University Library," which includes the definition of its agents and processes, in addition to indicators relating to interaction, variation and selection elements. The team working on the application of the tool is a knowledge management committee and they consider that the outcome of the meetings (which take place every two weeks) has already provided a better result than expected. It was confirmed that in order to become a collective understanding, knowledge shared by a team of 15 people require mediation and organization work, so that the information is not be lost and can be recorded; as proposed by the GC@BU tool.

Furthermore, the amount of detail from information collected in order to meet the verification criteria for the recognition spreadsheet imposed its representation in a graphical form. Whereas so far only one of the background elements of the GC@BU (adaptive complex systems vision) have been implemented, the team realized how specific, adaptive and dynamic is the GC@BU – such demands that emerged from this initial activity (the formalization and mapping processes, the creation of working groups, the management of physical spaces, among others) became small "branches" within an unpredictable network of relationships; the same as university libraries operating in this changing context (Bem *et al.*, 2016).

Notes

1. The learning commons module is also named learning/knowledge spaces module.

2. The elements of each module and their respective verification criteria can be found in the complete version of the doctoral thesis, available at http://tede.ufsc.br/teses/PEGC0364-T.pdf

3. Glossary and verification criteria can be found in the doctoral thesis that inspired this paper: http://tede.ufsc.br/teses/PEGC0364-T.pdf

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