Learning to manage in knowledge based organizations - the role of portfolios[1]

Ana Maria Ramalho Correia[13], Anabela Mesquita Sarmento[2] and Miguel de Castro Neto[3]
[1]INETI – Inst. Nacional de Eng., Tec. e Inovação, I. P., Lisboa, Portugal
[2]ISCAP / IPP – R. Dr. Jaime Lopes de Amorim and Universidade do Minho (Centro Algoritmi), Portugal
[3]ISEGI – Universidade Nova de Lisboa, Lisboa, Portugal
ana.correia@ineti.pt / acorreia@isegi.unl.pt
abmesquita@sapo.pt / sarmento@iscap.ipp.pt
mneto@isegi.unl.pt

Abstract: At the forefront of organizational performance are organizations which recognise that information, knowledge and their intelligent application are the essential factors of success. The know-how to promote these activities must now become a part of the "skills and abilities armoury" acquired by graduates in the domain of "Information Systems" and "Information Management".

This paper will address the use of "individual reflective portfolios" (IRP), either as "learning" or as "learning and assessment" tools in modules of the "Knowledge Management" course taught at two Portuguese Universities - Universidade Nova de Lisboa and Universidade de Coimbra.

This learning and assessment approach is aimed primarily at developing students; it enables them to reflect and make a meta-analysis of their learning process. At the same time, it gives students an opportunity to integrate their learning across subjects that are relevant to knowledge-based management. In one of the case studies described, it also provides an opportunity to expose them to a wide literature base, where several approaches to the use of knowledge in organizations are discussed. Results show that, in the initial stages, students do not see this methodology as useful (only time-wasting) but by the end of the course they recognise that it helps them to reflect on their learning processes, deepens their learning and helps keep up-to-date with the course content.

This paper introduces best practices for this teaching and learning approach and includes an evaluation of the methodology by a student sample.

Keywords: portfolio, teaching and learning, assessment, higher education, knowledge management, case study

1. Introduction

To operate effectively in today's economy, organisations need to become knowledge-based. This means not only that knowledge supplants other resources like labour, land and capital as the primary source of competitive advantage in the market place but also that "*the ability to create new knowledge, sharing new knowledge, and apply organizational knowledge to new situations becomes critical*" (Lesser, 2000:9). As Zack (2003) points out, knowledge–based organization attends to the effective application of existing knowledge and the creation of new knowledge, with four goals:

> *to ensure that knowledge from one part of a company is applied to activities in other parts; to ensure that knowledge is shared over time so that the company benefits from past experience; to make it possible for people from various parts of the organization to find each other and collaborate to create new knowledge; and to provide opportunities and incentives for experimentation and learning* (*op. cit.*).

Another important rationale for the knowledge-based organization is that more and more of the resources needed to complete a finished product lie outside the traditional physical and legal limits of a single organization, *i.e.* the rise of a networked economy where the growth of strategic alliances and joint ventures are a fundamental characteristic. Companies are increasingly aware that knowledge is often produced and shared as a by-product of interactions with customers, vendors, alliance partners and even competitors.

In parallel, the importance of raising awareness for KM lies in the difficulty of accessing knowledge, because the people who have it are either unavailable, have left the organisation or do not package and store information in such a way that other people can access and digest it to create new knowledge.

There are numerous definitions of KM and different understandings of its scope. Knowledge, as such, cannot be managed but we share von Krogh's (2002: 85) view that managers can aim at "reaching the organization's goals through the activities of capturing, sharing and creating knowledge"; for these activities we will use the term "Knowledge Management" (*ibid*). The main concerns for KM researchers and practitioners are:

- *The performance enhancement through organizational enabling conditions processes of knowledge capture/location, sharing and creation and communication technology tools.* (*op. cit*: 86).

Knowledge Management (KM) vs. Information Management (IM)

Although the concepts of KM and IM are frequently mistaken and equated there are considerable differences between them. In IM, one is concerned with documents and in particular with information access, technical handling, security, storage and delivery. KM, on the other hand, is concerned with the human aspect of information utilisation. As such, KM is about developing systems and processes that leverage information and knowledge in an organisation to promote originality, creativity, intelligence and learning.

It is recognised that SME's and start-up firms are major sources of job creation and growth in Europe (European Commission, 2007). It is also widely disseminated in the Lisbon Strategy, recently revised, which puts at its core the need for effective knowledge transfer and knowledge sharing in any knowledge–based organisation (Commission.., 2007). This strengthens the importance of the teaching of KM modules, especially in programmes of study that address "Information Management", "Information Systems" or "Information Technology".

The rest of this paper is organised as follows:
- the second section explains how Higher Education is changing to address the needs of the labour market, highlighting the requirement for students to become more reflective and autonomous learners,
- the third section deals with portfolios as an innovative tool to promote students to become reflective learners,
- the fourth section presents the results of two case studies using portfolios as a "learning" and as a" learning and assessment" methodology,
- the fifth and final section draws some conclusions, highlighting the best practices that can be drawn from the case studies.

2. HEI developing reflective and autonomous learners as a response to the challenges of knowledge based economies

Higher education institutions (HEI) across Europe are transforming, (reluctantly in some cases) as a result of changing state/university relationships, economic and social changes and globalization. They are placing increasing emphasis on individualisation of learning and learner autonomy. This approach largely stems from economic and market driven policies and the move towards mass-based higher education (PRILHE, 2004-2006). One of the major concerns in HEI relates to graduate employability (European Ministers…, 2005). To address this central issue, in rapidly changing contemporary, knowledge-based global economies, HEIs are embedding, in their programmes of studies, elements which provide students with transferable skills to take into employment. They are training their students i) to be aware of the role knowledge plays in the competitive marketplace, both at individual and organizational level; ii) to become progressively autonomous and independent learners; and iii) to promote "reflection on how skills and knowledge can be transferred to different contexts" (Smith *et al*, 2007:141).

3. Portfolio

Portfolios as collections of work created by an artist go back several hundreds of years (Tartwijk *et al.*, 2007:69). However, their relatively recent application to teaching and learning is an outcome of the

measures endorsed by the United Kingdom Government Review of post-compulsory educational provision – the Dearing Report – to ensure that individuals are equipped for life-long learning (Taylor *et al*. 1999: 147).

In the specialised literature, it is possible to find different nomenclatures to describe "portfolios" such as individual learning logs, diaries, logs, learning portfolios, learning diaries, portfolio logs or even learning record. The term "portfolio" is used in this paper.

As Moon says,

> "the term portfolio can be used for anything from a collection of work (e.g drawings) to a learning journal with the odd article or set of lecture notes included […] It is important to bear in mind there is not just one thing called a portfolio nor one way of managing the activity of compiling one (2004:160).

Portfolios are used in a range of professional education and professional development programmes for "learning, assessment, promotion and appraisal" (Klenowski *et al*. 2006:267). They are used in work-based learning; and they are an increasingly popular learning and assessment tool at all levels of education (Taylor *et al.,* 1999*:* 148; PRILHE, 2004-2006).

The higher education portfolio is used with two functions and purposes: (1) with a formative purpose to support learning and teaching and professional development (Klenowski, *et al.*, 2006: 268) and (2) to demonstrate evidence of achievements for summative purposes (appraisal / promotion and examinations) (Baume, Yorke and Coffey, 2004; Klenowski, *et al.*, 2006:268). As Groom and Maunonnen-Eskelinen (2006:292) point out, the portfolio is identified as "a format that provides an effective way to gather and report student progress over time", as it "can help to depict the nature and quality of a student's practice and illustrate the student's thinking, intentions and development".
Smith and Tillema (2003:625) in turn, distinguish different types of portfolios taking into account the growing literature on portfolios as an assessment tool.

In this paper, two case studies are presented on the use of portfolios in Knowledge Management modules at two Portuguese universities. The interest in the introduction of portfolios arose because the authors were the Portuguese partners of the PRILHE (Promoting Reflective Independent Learning in HE) project, funded by the European Commission Socrates Adult Education Programme Socrates – (113869-CP-1-2004-1-UK-GRUNDTVIG-G1) (Sep. 2004 – Sep. 2006), where the use of these tools in learning and assessment methodologies was investigated to promote student critical reflection and autonomy (PRILHE, 2004-2006).

Our main goal in using the portfolios as part of "learning" or "learning and assessment" methodologies in the KM modules, described in this paper, was to help the students to become more autonomous and reflective, while understanding the way they learned. In parallel, taking into account the cross-disciplinary nature of KM and the different approaches to KM practices, it is essential to supply an integrated view of what is happening in real world. The use of the portfolio as a learning and assessment tool provided an opportunity to expose students to a wide literature base, where several approaches to the use of knowledge in organizations are discussed. Furthermore, and as Baume (2001a) refers, the use of portfolios also stimulates students to produce work which they value; it encourages students to do things which promote learning and helps them identify the limits of what they know, so reinforcing the willingness to deepen their learning (Baume, 2001b).

4. Case studies

4.1 Methodology
Case study research was selected as it recognizes the importance of context and enables in-depth analysis (Yin, 1994). This type of research design also allowed the flexibility needed to take into account the dynamics of the process involved (Klenowski *et al.*, 2006).

The case studies presented illustrate the integration of ideas about learning and assessment in two particular classroom contexts. The two sites shared the following common characteristics: course tutors using portfolios to support participants' learning and participants being provided with opportunities to reflect on their learning and assessment experiences.

To obtain course participants' responses about their use of the portfolio for learning, web-questionnaires were used. The responses were analysed and triangulated with interviews and observation data collected throughout the course. During the course, after each portfolio completion, the lecturer analysed the results and gave feedback to the students. Action research was used, as sometimes it was necessary to adapt and change the teaching methodology to overcome the difficulties felt by the students (Klenowski *et al.*, 2006).

Data was analysed, first within each individual case and then across them. This paper summarizes the cases and the emergent themes.

4.1. ISEGI case

The Master's in "Estatística e Gestão da Informação" (Statistics and Information Management)" is offered by the ISEGI (Instituto Superior de Estatística e Gestão da Informação) / UNL (Universidade Nova de Lisboa (ISEGI.., 2007) The customer of this Master's programme of studies is generally speaking someone in the field of Pure or Applied Sciences, namely Mathematics or Engineering. However, it is also opened to students from other fields such as Social Sciences, Management, Arts or Languages. This means that it is possible to be working with a very heterogeneous class of students, having different backgrounds and professional experiences.

The module where the portfolio is used as a learning and assessment tool is "Knowledge Management" (KM) (2nd semester) which, in the academic year 2006/2007, had around 25 participants. The aims of this module are to introduce students to effective organizational KM programmes that exploit and nurture human, structural, social, relationships and intellectual capital. For this effect, it provides a broad description of the scope and nature of the field of study of KM, outlining the strengths and weaknesses of the different KM approaches, including the application of a variety of models to manage Social and Intellectual Capital. Different strategies to promote knowledge creation and sharing are introduced. The use of KM systems is also described and put in perspective.

Students' assessment in the module comprises the Individual Reflective Portfolio (IRP) mark as well as a final examination at the end of the semester. One aspect that is also stressed by the lecturer in the first class is that she shares the view that assessment is seen as an integral part of learning, not as a built-in extra at the end of teaching and learning process (Brown and Glasner, 1999:vii; Tigelaar *et al.*, 2005:595). Or as Rust (2007) puts it in a recent article calling for a "Scholarship on assessment", "good assessment supports and positively influences student learning" (*op.cit.*:230).

Although the IRP in this module is devised as a learning and assessment tool, it is its use as a learning tool which is discussed here. There are three submissions of the portfolio. The first submission takes place in the third week after the semester starts and the second four weeks later. These two submissions have formative purposes – that is, following each portfolio completion, the lecturer gives feedback to the students. The last submission of the IRP, which is the "Final Version", will have summative goals.

As explained by the lecturer in the first class of the module, when the objectives of the module and students' assessment procedures are introduced, the IRP should illustrate how students are absorbing the concepts and their understanding of the readings of several articles and book chapters, included in the module's reading. They are encouraged to include critical analysis of readings, including comments and evaluations of their own learning reflections. The portfolio organization is also explained. Students are also asked to say where they are finding difficulties; these comments are used as signposts for the lecturer to review his/her teaching.

In the development of their portfolios, the students have to indicate their initial objectives for the curricular unit and if they have been attained (totally, partially or not at all); the difficulties felt in the portfolio creation as well as in the absorption of the curricular unit contents; the way they overcome those difficulties and the usefulness of what was learnt for their professions. The content of the portfolio also registers their comments on the papers read and analysed.

Summing up, the IRP in this module is used as a learning and assessment tool. It aims to stimulate reflection by students when submitting work, allowing them to comment on what they learned in class and their further reading for tutorials. The IRP is also intended to help them look back on what they achieved and give them an integrated view of KM strategies and practices for competitive advantage.

4.2. Universidade de Coimbra case

The Diploma "Tecnologias de Informação Visual" (Visual Information Technologies) is offered by the Computer and Electronic and Engineering Department of the Science and Technology Faculty of the Coimbra University since 2002. Its objective is to train professionals that will be able to use computational tools to generate, select and manipulate visual information. Another aim of this course is to prepare students to face international professional competition in a positive way.

The module which used the portfolio as a learning tool was "Knowledge and Information Management" (KIM) (first cycle, 3rd year, 1st semester) in 2005/2006, with 15 participants. This module has as objectives: to help the students to be aware of the changes in the environment of the organization; to contribute to the development of critical thinking concerning KM and to develop the capacity to question the *status quo*; to select, structure, organize and present information as well as to suggest practical actions to promote and improve KM. In a course where visual and information technology, mathematics and graphic computation are the most important subjects, the module of KIM appears as something unusual. It presents concepts completely new for most students and forces them to think in a different way. For the first time they see an organization in a holistic way and understand what is meant by "business".

The module involves lectures (theory presentation), case studies and debates. Learning and assessment comprise the development of a project (analysis of a real organizational situation and proposal of practical actions to improve its KM practices), oral presentation of the project to the class, case studies resolution and debates and completion of a portfolio.

The concept of a portfolio as a record is introduced by the tutor as an ongoing process of learning. Portfolios as learning records,

> *"require gathering and interrogating increasingly complex insights about learning, over an extended period of time, through individual reflection and collective dialogue"* (Klenowski, *et al.* 2006: 274).

The portfolio in this KM module is intended to demonstrate progression in recording and analyzing learning experiences. It also emphasises the awareness and analysis of the learning process; allows participants to examine their own learning and meta-learning strategies; has a role in helping participants to reflect on how they support the learning of others; does not form part of coursework or evaluation but may be drawn on within coursework to illuminate learning, allowing participants freedom to record whatever they feel is appropriate.

Students were asked to complete at least four portfolios during the semester. For the first three, the tutor suggested the following questions: (1) What were my objectives for the last X classes? Were they attained? If not, why not? (2) What did I learn? (and here the student had to fully describe what he/she had learnt) (3) How did I learn? How do I prefer to learn or how do I learn better? (4) When I had doubts / problems how did I solve them?

For the last portfolio another question was added: (5) Did the completion of the portfolio during the semester help to improve my learning / the way I learn / to reflect or to be more critical?
They had to deliver the first portfolio about three weeks after the beginning of the course and the last one in the last day of classes. The other two were submitted in between.

5. Results

In this section a cross-case analysis is made. Although there are differences in the context and purpose of each case, there are some common emergent issues. These will be referred to in the following paragraphs. The presentation will cover the themes of "clarity of purpose", "approach to learning" and "difficulties felt by students".

Clarity of purpose

The first issue that emerged is the need to clearly identify the purpose of the portfolio at the outset. (Klenowski, *et. al.* 2006). The portfolio can be used for summative assessment, formative assessment and as a record (*op. cit.*). Usually, the conceptions that participants have of learning, influence the importance they attach to the portfolio, how and when they should use it and what they should record (*op. cit.*). Furthermore, the tutor must be aware that participants will use the portfolio according to their own perceptions of what they think it is and the way it should be used. This means that the tutor must

explain and clarify that the portfolio is not simply a collection of evidence but a "record of learning" (*op. cit.).*

In Case Study 1 (CS1) the portfolio was used for both formative and summative assessment – as a learning and assessment tool - while in Case Study 2 (CS2), it was used for formative assessment only – as a learning tool. In the first situation, participants were given the opportunity to understand their learning by reflecting about what they were reading as well as developing critical thinking. In the second situation, participants analysed their learning process discovering how they learned and how they prefer to learn. Some of their statements are:

> *"I believe that portfolios are a very important contribution to help students to be conscious about lecture contents, stimulating the questioning of the curricular unit content and learning processes. Thus, they are an important tool to facilitate a structured reflection about the learning process"* (CS2).
> *"The portfolios help to understand the subject and the content. (…) For me, it helped me to see how I cope with the contents and to see if I really learned something. In some subjects, students learn without knowing it and sometimes they think that subject was useless. The portfolios helped us to see what our initial situation was and how we evolved over time"* (CS2).

Generally speaking, in both cases, the first portfolio submission was rather synthetic. Students noted that they have never had anything like this as coursework. They felt "puzzled" by the idea of commenting on the course contents, the teaching approaches, how to reflect on their way of learning and indicating where they were feeling difficulties in learning.

As an innovative teaching and learning approach – both for students as well as for the lecturers – it became evident at the first delivery of portfolios that students required a clearer explanation of what was expected from a portfolio. First of all it was pointed out that the portfolio is not just a collection of data. In CS1, students were encouraged to use it as their "study journal"; not just compiling notes about what they learned in the class, but also their individual preparation for tutorials, and the extra readings they did, as well as their comments on how what they were reading related with what they had learned before, which was of relevance, for the subject, and what lessons they could "apply" to their working environments. The aspect of critical reflection or commentary on how they understood they were learning was also very much stressed at this first feedback. The lecturer also explained how it should be structured - although the portfolio is a personal document, it is very important for it to be well structured, for the sake of clarity of evidence of what student has actually learned.

As the tutor analysed the results and gave feedback after each delivery, it was possible to see an evolution in the content of the portfolio – the contents became more complete, had more depth and were more critical. Students were also more prepared to make criticisms of the way the tutor lectured:

> *"The fact that practical classes are on the same day of the theoretical classes helps to understand the contents because we discuss examples and problems and see where to apply what we have learned"* (CS2 - 2nd delivery).
> *"I recognize the importance of the theoretical classes but I think that a mixed model (theory and practice), with emphasis on the practical issues, would be more effective in my learning process"* (CS2 – 2nd delivery).
> *"The method of using the practical classes to discuss and work on our project was a very good idea because we had time to develop and at the same time we had the opinion of the tutor on how and what we should do"* (CS2 – 3rd delivery).

In CS2, the portfolio evolved differently for the course participants. There were students that used it as an opportunity to summarize everything they have learned, so the portfolio helped them to review concepts and estimate their understanding of the topics taught. In those cases, this tool helped the learner to see what he / she was learning and to keep up-to-date. This process of reviewing, noticing, interrogating and self-assessing adds a meta-dimension to the learning process as it enables the student not only to understand what has been learnt but, above all, to understand his or her own learning process. However, there were also students who just presented the titles of the lessons.

Approach to learning
One important issue of any portfolio is reflection. In the cases studied, participants reflected on their practice and learning and understood the complexities of the learning process. In both cases, students reflected about what they were learning and the way they were learning. Of course, in this

process, dialogue is very important. Some students may find the completion of the portfolio difficult and this dialogue can increase their confidence:

> *"Initially, it was very difficult to write because my knowledge about the contents was very limited"* (CS2).

> *"I was afraid that lecturer thought that I was repeating myself or focusing on unwanted topics. Sometimes we had to complete two portfolios very close together and so I repeated myself"* (CS2).

Usually, students feel that, although there were initial difficulties, this tool is very useful as it helps them to develop new competencies related to reflection and autonomy:

> *"Portfolios are a valuable tool as they illustrate the different phases of students learning process"* (CS1).

> *"Portfolios are very useful as they enable us to collect and categorise all ideas in one place, as a result of the several readings one has to do in such a wide area of study [KM]"* (CS1).

Furthermore, this tool also helps them to be more self disciplined and concentrate on the important issues to be learned:

> *"The use of the Portfolio is very useful as it makes us to be more self-disciplined and to have deeper concentration of the subject instead of only regurgitating the subject. One has to reflect and to do research, which leads us to learn better the subject. In parallel we learn better ourselves because we learn how we can learn better…"* (CS1).

> *"This new method may change the way students learn. We [in Portugal] are not yet fully prepared for this approach, however I consider it can be an "added value" to enhance the quality of Higher Education in Portugal. On the one hand this procedure makes students participate more in depth in the curricular unit, which makes students study in a continuous way; however, this has as a drawback, it requires a lot of the student's time and we have other curricular units"* (CS1).

Difficulties found by students

As already said, the use of this tool was not straightforward. Students felt some difficulties with its completion. In both cases, at the beginning they didn't understand what they had to do and they were very laconic when describing their difficulties with the subject. Students also profited, in CS2, to make comments concerning the method of teaching which helped the tutor to change the way he / she taught.

> *"As the Portfolio is not only a learning tool but an assessment tool, the explanation by the lecturer of the evaluation parameters was very useful to help to understand what is expected from the portfolio".* (CS1)

> *"Reading papers and book chapters in English, as well as the use of new technical terms took me longer; understanding how to structure the portfolio was a difficulty I felt when I was starting; took me sometime to find my own "best method".* (CS1)

Results also show that, in the initial stages, students do not see this tool as useful (only time-wasting) but by the end of the course they recognise that it helps them to reflect on their learning processes and to keep up-to-date with the course content. As some students say:

> *"I fully/strongly recommend it as it is an opportunity for the student to open his mind [reflect], with the advantage that his /her participation is taken into account in the student assessment… this is much better then to be assessed only by examination in which the stress and feeling nervous does not allow, many times, one to show what has learned".* (CS1).

> *"The use of this tool stimulates the use of brains by students. So it is very welcome; however I would suggest having more feedback [on Portfolio submissions] from the lecturer"* (CS1).

> *"This tool is particular valuable when students have some professional experience; the critical thinking in this case can be significantly improved by use of this tool and vice versa"* (CS1).

6. Conclusion

This paper has presented the initial results of an on-going research into how best to teach KM issues in Portuguese Universities, by using the Individual Reflective Portfolio. Despite the difficulties found in the initial stages, it is considered that students, generally speaking, welcome this new approach. Despite the extra work involved, they recognise the opportunity portfolios offer for a teaching tool which aims to be student centred, more individualised and which promotes student autonomy. In conclusion, portfolio used as a "learning" or as a "learning and assessment" tool requires extra work

from both teachers and students but can go some way towards meeting the challenges of the Bologna process in European Universities!

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