Exploiting Motivation and Self-efficacy through the Implementation of a Self-Regulated Oriented ePortfolio

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Abstract—Critical affective factors like motivation and self-beliefs promote persistence in changes; they affect the learning processes and direct individuals toward certain goals. On these grounds, it is explored if the extent motivation and self-efficacy can be positively impacted through the implementation of a self-regulated oriented ePortfolio. An ePortfolio, constituting an innovative e-learning tool, supported by the self-regulated learning (SRL) theory is being developed. Based on the findings of the proposed ePortfolio implementation, a conceptual framework aligning aspects (cognitive, motivational, affective and social) of the cyclical SRL model with 21st century life and career competences is proposed. In the context of the present study, quasi-experimental research with comparison groups in pre/post-tests is conducted in order to examine motivational and self-efficacy beliefs. The findings reveal that students’ motivational and self-efficacy beliefs tend to increase upon completion of the experimental procedure. Furthermore, the potential of the development of ePortfolios should be further studied to empower students to become active learners and enhance their competences.

Index Terms—ePortfolios, Motivation, Self-efficacy Beliefs, Self-Regulated Learning.

I. INTRODUCTION

The interconnected world establishes a new powerful digital identity for every individual who needs continuous (self) management. Individuals are expected to be prepared to conquer the challenges of tomorrow and to thrive in chaos. Towards this end, critical affective factors like motivation and self-efficacy beliefs promote persistence in changes, affect the learning processes and direct individuals toward achieving certain goals. On these grounds, we examine how motivation and self-efficacy can be positively impacted through the implementation of a self-regulated oriented ePortfolio.

This study’s design principles, emphasize the impact of Web 2.0 and social software on the ePortfolio process and the need for accommodating a pedagogical model that will strengthen learners’ competences. An ePortfolio, constituting an innovative e-learning tool, supported by the self-regulated learning (SRL) theory is being developed. The challenge of the research is “How the self-regulated oriented ePortfolio can stimulate students: to acquire 21st century skills? to engage in new learning approaches enthusiastically? to select the tools that best meet their needs? and to understand how to solve problems?” It is argued that educational experiences should support the upgrading of work-related competences (competence as a set of knowledge, skills, attitudes and values) and highlight the importance of life and career competences for the 21st century learners [1]. Considering that ‘key competences are learned, updated and maintained throughout life’ [2] we recommend the process of constructing an ePortfolio, which is ‘a tool that allows individuals to organize their learning and experience in a way they find natural and stimulating’ [3]. Furthermore, motivation and self-efficacy can influence competences as well as learners’ performance, academic motivation, aspirations, goal persistence, learning and achievements.

To this end, we conducted a quasi-experimental research with comparison groups in pre/post-tests in order to examine motivational and self-efficacy beliefs. It is suggested that these factors are important SRL indicators. Based on the findings of the proposed ePortfolio implementation, a conceptual framework aligning aspects (cognitive, motivational, affective and social) of the cyclical SRL model with 21st century life and career competences is proposed.

The paper is organized in four sections. The literature review is detailed in Section 2 along with an introduction to the ePortfolio and Self-Regulated Learning fields. In the same section, motivation and self-efficacy beliefs are discussed. In section 3 the experimental procedure (method and results) is delineated; the functionalities of MySelf ePortfolio are also presented. Finally, Section 4 encompasses conclusions and future plans.

II. LITERATURE REVIEW

A. ePortfolios

Research on ePortfolios demonstrates diversity in the terms used for the definitions, purposes, processes and the implementation issues. Based on various important definitions, an ePortfolio can be defined as ‘a digital collection of information where an individual collects, selects, creates, reflects upon, interprets, evaluates, targets on specific audiences and includes accredited evidence for lifelong learning and skills of individuals in academic and professional context’ [4], [5], [6], [7].

ePortfolios are delivered in order to satisfy different requirements and cover multiple purposes such as: assessment, presentation, learning, personal development
planning, multiple owner and working [8]. The implementation process of an ePortfolio depends on the selection of the available software tools, which can be generic and customized tools such as web-building tools (templates and web-editing software), stand-alone commercial products, open source products (e.g. Open Source Portfolio software), university-designed software, virtual learning environments, learning management systems and Web 2.0 technologies [9]. The implementation of ePortfolios based on Web 2.0 technologies supports web-data sharing, participation, collaboration, reflection and can combine informal and formal education [10], [11], [12].

B. Self-Regulated Learning

Towards the delivery of an effective ePortfolio, efficiently supporting learning, research should accentuate the establishment of an ePortfolio pedagogy that will encourage individuals to become dynamic participants in their own learning [13]. On such premises, ePortfolios should accommodate for dynamic, learner-centred pedagogical models and instructional strategies [14].

It is suggested that the nature of an ePortfolio can be combined with the principles of Self-Regulated Learning (SRL) [4], [15], [16]. Furthermore, the process of structuring an ePortfolio enables individuals to think critically, to act independently and to elaborate in a self-regulated manner [17]. SRL can be defined as “the degree to which students are meta-cognitively, motivationally, and behaviorally active participants in their own learning process” [18]. The process of SRL involves a critical selection of actions (cognitive, affective, social and behavior) that ought to be adapted to each learning experience [19]:

- Setting meaningful goals
- Adopting dynamic strategies for managing the goals,
- Monitoring the learning process,
- Restructuring learning environment and rethinking goals,
- Managing time,
- Self-evaluating learning paths,
- Attributing meaning to outcomes, and finally
- Adapting future strategies.

C. Motivation and Self-efficacy Beliefs

SRL is a process that consists of detailed knowledge of skills and involves self-awareness, self-motivation, and behavioural skills to implement that knowledge [20]. Reference [20] developed a cyclical SRL model, which is distinguished into three distinct phases: Forethought, Performance Control and Self-Reflection. This SRL model combines different cognitive, motivational, affective and social aspects. However, research principally emphasizes the regulation of cognition (how individuals can exploit cognitive/metacognitive strategies in order to enhance their academic performance) but less attention has been attributed to the regulation of motivation (how individuals can utilize their motivational and self-efficacy beliefs so as to regulate and achieve their goals) [21], [22].

This research sheds light on self-efficacy beliefs, which constitute a powerful motivational factor in SRL [23]. According to reference [24], self-efficacy has motivational power and supports individuals in determining the amount of effort to be invested. Recent research has demonstrated that motivation influences SRL but regulation is still considered to be the teacher’s responsibility [21], [25]. This means that learning environments, that will help teachers utilize methods to support their students in using SRL strategies, should be designed. Such learning environments should also develop students’ mindset in terms of identifying the effort to be exerted on a task, how long they will persevere when faced with difficulties, and how resilient they should be once confronted with adverse situations.

III. METHOD

A. Method

A quasi-experimental research is conducted within an undergraduate computer science programme in tertiary education, in a course titled “IT -centric Professional Development”. Within this course theories, skills and competences necessary for the development of effective performance in the changing nature of IT working environment are reviewed. According to ePortfolios’ implementation specifications, the outline of the research design has been founded on the alignment of the course objectives with the ePortfolio purpose. The participants got involved with the following case: How can my career and life competences be empowered through a self-regulated oriented ePortfolio?

B. Research Question

The research question was: “How can motivation and self-efficacy be positively impacted through the implementation of a self-regulated oriented ePortfolio?”

C. Participants

The sample of the study consisted of 48 undergraduate students (28 males and 20 females) who participated voluntarily. Participants assigned in the Experimental Group (N=48) followed the process of implementing the self-regulated oriented ePortfolio in order to acquire new knowledge and enrich their learning experiences.

D. The Tool: MySelf ePortfolio

The emerging idea for delivering the ePortfolio is driven by technological and pedagogical considerations. Having this in mind, an open-source social networking engine, Elgg, has been selected. Elgg is continually developed and updated via an active community of organizations, companies, developers and users around the world. The ePortfolio tool was named ‘MySelf ePortfolio’ and it encompasses the functionalities of Web 2.0 technologies, which are simple, flexible and open tools. What is more, ‘MySelf ePortfolio’ was designed along the lines of the SRL framework with the aim of instilling a learning culture in learners (Figure 1).
‘MySelf ePortfolio’ is simple; it comprises a horizontal menu with 5 profile sections, a dashboard, tools, messages and settings. Users can create, change, delete and update his profile and dashboard. The vision behind ‘MySelf ePortfolio’ is to provide a dynamic social networking tool that will serve as a vehicle for enhancing SRL competence and promoting academic and professional development. The initial idea was to provide users with simple tools to support their learning and help them realize their metacognitive strengths. We further seek to highlight the benefits of a social networking tool for enhancing SRL skills, academic and professional development.

It is suggested that a successful implementation of an ePortfolio involves various stakeholders. Especially, in the context of tertiary education: institutions should be able to provide infrastructure, academic staff should be capable of integrating ePortfolios in the design of the course and students need a range of skills so as to develop and maintain an ePortfolio.

The process of designing and developing the proposed ePortfolio followed reference [26] soundly thought out implementation guidelines. Hence, a ‘Methodology for ePortfolio implementation in tertiary education’ consisting of specific steps has been developed [15]:

- Step1: Define ePortfolio purpose.
- Step2: Select software and clarify ePortfolio scope.
- Step3: Align ePortfolio purpose to the course objectives.
- Step4: ePortfolio activities
- Step5: Users’ preparation
- Step6: ePortfolio Evaluation

E. Experimental Procedure

The experimental procedure follows reference [20] cyclical SRL model for the implementation of ‘MySelf ePortfolio’. Each phase consists of several learner-centred activities and reflective questions. The rationale of this structured process is to scaffold students during ‘MySelf ePortfolio’ implementation and empower them to become active learners so as to enrich their knowledge and academic skills (Figure 2).

Prior to the procedure’s initiation, participants attended a series of workshops in order to understand the fundamental ePortfolio characteristics (participants had no previous experience in creating an ePortfolio). During the procedure, participants followed the SRL phases in the context of ‘MySelf ePortfolio’ (Figure 2):

1. ‘Forethought’ Phase: Students (individual mode) enter the SRL cycle for planning their learning efforts. To this end, each student got involved in specific activities, such as: identifying personality characteristics and skills, self-presentation, goal setting and strategic goal planning.

2. ‘Performance Control’ Phase: Students proceed to the second phase where they gather and elaborate on information to be employed to complement their learning efforts. Students (individual and group mode) also got engaged in specific learning activities such as familiarizing with learning strategies, identifying the SRL process, time management, my curriculum vitae synthesis and participation in conflict management scenarios.

3. ‘Self-Reflection’ Phase: Whilst in the third phase, students reflect on the learning activities performed to evaluate their performance. This phase includes self-judgement and self-reactions, performed along with self-evaluation and self-monitoring rubrics.

The experimental procedure addressed the question ‘How can motivation and self-efficacy be positively impacted through the implementation of MySelf ePortfolio?’ With this purpose in mind, participants completed an adapted version of the Motivated Strategies for Learning Questionnaire (MSLQ- Part A: Motivations) right before and after the research procedure to enable the measurement of SRL aspects (cognitive, motivation, affective and social) [27]. This research focuses on the measurement of motivational and self-efficacy beliefs before and after the intervention through the experimental procedure. A Likert-type questionnaire (from 1 = “Strongly Disagree” to 5 = “Strongly Agree”) consisting of 31 items divided in sub-scales (intrinsic motivation, extrinsic motivation, self-efficacy and task value) has been employed. The items used in the present study were similar to the original MSLQ, except for some items that had to re-worded to reflect the online nature of ‘MySelf ePortfolio’. The four subscales used in this study included (1) a 4-item intrinsic motivation scale intended to measure the intrinsic goal orientation towards different learning tasks (e.g., challenging tasks, learning that arises
curiosity), (2) a 4-item extrinsic motivation scale to measure the extrinsic goal orientation towards different learning tasks (e.g., getting good grades, showing my abilities), (3) a 8-item self-efficacy for learning intended to assess perceptions success expectancy and confidence in one’s ability to perform all activities in ‘MySelf ePortfolio’; and finally (4) a 6-item task value scale designed to measure students’ perceptions of the interest ‘MySelf ePortfolio’ can trigger, its perceived usefulness and value.

As depicted the results of Cronbach’s alpha coefficient for internal consistency for the 31 items in the Pre-Test is $\alpha=0.622$ and $\alpha=0.653$ for the Post-Test. These results are reasonable and are determined by both the number of items in the scale and the mean inter-item correlations.

F. Results

For the needs of this research, a paired-samples t-test was taken to explore statistical differences (pre and post-test) on the motivational and affective factors levels.

Table 1 indicates that the experimental group appeared to have a significant increase on the means across the motivational and affective factors, namely: F1=intrinsic motivation, F2=extrinsic motivation, F3=self-efficacy, F4= task value.

The contrast in the ‘Intrinsic Motivation’ (F1) between the pre-test and post-test was significant, $t(47) = -4.01$, $p < 0.01$. Results indicate that after the completion of ‘MySelf ePortfolio’, students’ intrinsic motivation improved. This means that students displayed interest in the assigned learning activities for reasons such as challenge, curiosity, and mastery. Furthermore, the contrast in the ‘Extrinsic Motivation’ (F2) between the pre-test and post-test was significant, $t(47) = -5.15$, $p < 0.01$. Results indicate that post to the completion of the procedure, students’ extrinsic motivation also improved. An important aspect of extrinsic motivation is the acquisition of excellent grades. Another significant contrast is depicted in ‘Self-efficacy’ (F3) between the pre-test and post-test, $t(47) = -13.66$, $p < 0.01$. Results indicate that after the completion of the process, students were more confident that they could master the skills being taught through ‘MySelf ePortfolio’, and they did expect to do well in the procedure. Lastly, the contrast in the ‘Task Value’ (F4) between the pre-test and post-test was significant, $t(47) = -11.52$, $p < 0.01$. Results indicate that after the completion of ‘MySelf ePortfolio’, students viewed the ePortfolio content in a positive light. Participants also believed that the content was useful, and they could use what they have learned for their academic and professional development.

This means that having completed ‘MySelf ePortfolio’, students have probably developed an understanding of identifying and managing strategies and processes that influence their motivation. These strategies include attempts to regulate various motivational beliefs such as goal orientation, self-efficacy, task value beliefs and personal interest in the task.

### Table 1

<table>
<thead>
<tr>
<th>SRL Factors</th>
<th>Pre-Test M</th>
<th>Pre-Test SD</th>
<th>Post-Test M</th>
<th>Post-Test SD</th>
<th>t-value</th>
<th>P*</th>
</tr>
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<tr>
<td>F1</td>
<td>3.864</td>
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<td>1.891</td>
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<td>0.000</td>
</tr>
<tr>
<td>F2</td>
<td>3.567</td>
<td>0.483</td>
<td>4.968</td>
<td>1.917</td>
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<td>0.000</td>
</tr>
<tr>
<td>F3</td>
<td>3.422</td>
<td>0.446</td>
<td>4.747</td>
<td>0.414</td>
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<td>0.000</td>
</tr>
<tr>
<td>F4</td>
<td>3.871</td>
<td>0.433</td>
<td>4.763</td>
<td>0.396</td>
<td>-11.52</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*p*=0.01

### IV. Conclusions and Discussion

The aim of this research is the development of an ePortfolio, an innovative e-learning tool, supported by the self-regulated learning (SRL) theory. Multiple research questions attempt to deliver answers to different aspects, such as: the usability and effectiveness of a self-regulated oriented ePortfolio, the differences in SRL competences during the procedure, the level of students’ engagement. A central procedure implication (implementation of MySelf ePortfolio) is a conceptual framework that aligns the cyclical SRL model aspects (cognitive, motivational, affective and social) with the 21st century life and career competences [15].

In this study, a sufficient answer to the question ‘How motivation and self-efficacy can be positively impacted through the implementation of MySelf ePortfolio?’ is attempted to be provided through the experimental procedure. The findings reveal that students’ motivational and self-efficacy beliefs tend to increase after the completion of the experimental procedure. A critical limitation of the research, however, is related to the fact that the research instrument (MSLQ) utilized to identify the motivational and affective factors does not involve actions such as monitoring, controlling, regulating students’ motivation or affect [23]. It is suggested that the MSLQ is a self-reporting instrument; it measures students’ perceptions rather than their SRL behavior. To counteract this limitation, it is argued that a more dynamic, multi-dimensional instrument should be developed so as to assess motivational and affective self-regulatory strategies.

Conclusively, the potential of developing ePortfolios should be further studied in order to empower students to become active learners, enhance their competences (such as hard and soft skills, knowledge, problem solving skills, time management skills, communication skills etc), monitor their learning process and bolster academic and professional development in the networked world.

### References


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