

Use of Emerging Mobile Technologies in Portfolio Development

Ejaz Ahmed, Rupert Ward
School of Computing and Engineering
University of Huddersfield, UK
{e.ahmed, r.r.ward}@hud.ac.uk

Stephen White
School of Human and Health Sciences
University of Huddersfield, UK
stephen.white@hud.ac.uk

Abdul Jabbar
The Business School
University of Huddersfield, UK
a.jabbar@hud.ac.uk

Abstract - In the UK, implementing personal development planning (PDP) is an obligatory requirement across all Higher Education awards. This has led to a number of institutions requiring students to produce electronic portfolios to meet this requirement. However, far too little attention has been paid to utilising the powerful functionalities and high levels of connectivity of emerging mobile technology. This social study seeks to discover a potential role of emerging mobile technology in portfolio development and its effects on students' reflective capacity and engagement with PDP. To raise students' engagement with PDP, a mobile application (HUD iPDP) for Apple mobile devices was developed with fifty-one undergraduate students participating in this study. The data collected was both qualitative and quantitative. Results revealed a high level of interest among students and the potential for mobile technology to enhance the process of PDP.

Keywords - Reflection; PDP; e-Portfolio; Mobile learning.

I. INTRODUCTION

With the rapid development of mobile technology, its suitability to learning activities is growing. It is providing students with access to truly mobile computers that fit in their hands and can go in their pockets. Mobile devices today are more powerful in functionality and connectivity than the desktop computers we used to have in the late 1990s. Students are attracted to new mobile phones because they are small, interactive and provide connectivity. Their ubiquity provides a valuable opportunity for educators to embed learning more effectively by enabling students to reflect at any point on their studies and development.

Personal Development Planning (PDP) is considered a significant pedagogical tool in higher education. It enhances the capacity for learners to reflect, plan and take responsibility for the primary objectives of PDP [1]. The traditional paper-based portfolio format has existed in HE in the past; however, the recent trend has been towards electronic e-Portfolio. The terms 'e-Portfolio', 'Progress File' and 'PDP' are often mentioned interchangeably in the literature [2]. JISC projects discovered that there have been tangible benefits in the use of e-Portfolios in relation to efficiency and enhancement in quality of PDP [3]. Most e-Portfolios are dynamic web applications using databases which enhance the quality of evidence, reflection, skills development and students' motivation. Emerging mobile technologies are equipped with hardware and software powerful enough to provide functionality and a high level of connectivity to easily augment existing e-Portfolios. As we

use mobile devices in portfolio development, this can be described as m-portfolio (mobile Portfolio).

The aim of this paper is to discuss the outcome of a social study conducted to investigate the potential use of mobile technology in portfolio development. The paper evaluates the students' experience with PDP using smartphones, and with a bespoke mobile application to support PDP, which was developed and tested. The paper consists of four parts. First, it reviews the existing literature relevant to PDP, e-portfolio and role of mobile technology within this. Following this, the research method and procedures used in the study are presented. Next, results are discussed and summarised. Finally the paper concludes with a discussion on the implications, limitations and directions for further research.

II. CONCEPTUAL FRAMEWORK

The current policy on Personal Development Planning (PDP) emerged from the Dearing Report [4] which recommended that UK Higher Education Institutions (HEIs) should formulate a progress file, PDP, to enable students to 'monitor, build and reflect on their personal development' [4]. The Dearing Report advocated HEIs provide a mechanism for PDP but left the actual implementation to the discretion of individual institutions. The Quality Assurance Agency for Higher Education [5], who oversee its use, define PDP as 'a structured and supported process undertaken by an individual to reflect upon their own learning, performance and / or achievement and to plan for their personal, educational and career development' [5]. The concept of personal development itself had existed in many institutions [6] long before Dearing's recommendations, with the idea of a 'reflective practitioner' [7] already popular in nursing and teaching professions for example.

Reflection is a key element of the process of PDP and acts as a vehicle for turning 'experience into learning' [8] by combining different thoughts and ideas together. This personal experience in combination with formal learning results in 'deep' learning [9]. The QAA guidelines for PDP state that reflection is 'a process that involves self-reflection, the creation of personal records, planning and monitoring progress towards the achievement of personal objectives' [5]. Boyd & Fales [10] define reflection as 'a process of internally examining and exploring an issue of concern triggered by an experience, which creates and clarifies meaning in terms of self and results in a changed conceptual perspective'. It has been suggested that reflection process based on personal experience at regular instances enables

students to clarify for themselves the process of development.

A considerable amount of literature has been published suggesting benefits from implementing e-portfolios [9, 11, 12]. Using a paper-based portfolio (PBP) has been an approach practiced by some disciplines in HE such as nursing, teacher training, art and finance. However, electronic portfolios are becoming more commonplace as technology advances. Electronic portfolios or web-based-portfolios (WBPs) are preferred over paper-based portfolios (PBPs) because they enhance students' motivation and are more user-friendly [13]. Madden [14] described an e-portfolio as 'an archive of material, relating to an individual, held in a digital format'. Many projects funded by JISC [3] discovered that e-Portfolios enhance the quality of evidence, reflection and the skills development process. An electronic portfolio saves time in information retrieval, supports reflection, raises presentation and improves students' motivation for PDP. It gives students an opportunity to customise the PDP and increase their ability to share and transfer information more conveniently. Research shows that time spent on PDP increases significantly with the use of web-based portfolios as compared to paper-based portfolios [13].

Advances in mobile technology are changing the pedagogical possibilities of 'Mobile Learning'. Research suggests mobile technology can enhance various features of teaching and learning such as reducing the time for tedious work, engaging students in learning activities, facilitating group collaborative learning, empowering the teacher to monitor students' learning progress and recording teaching and learning processes as portfolios [15]. The positive implications of e-Portfolios and pedagogical possibilities of new mobile technologies can be used to enhance the process of PDP by using it in portfolio development.

III. METHODOLOGY

The target population for this study consisted of first year undergraduate students in the School of Computing and Engineering at the University of Huddersfield. A sample of 74 randomly chosen students was divided into three groups; group A comprised 27 students with Apple mobile devices (iPhone, iPod Touch and iPad), group B consisted of 27 students with non-Apple smartphones; whilst group C contained a control group of 20 students. The control group was not introduced to the study until their views were collected in the form of questionnaires, interviews and a focus group session. From each group, eight participating students were randomly chosen for interviews and eight for focus group sessions. This selection was made from the students who completed the online survey. The length of this study was approximately eight weeks, which started from the first week of the students' academic year in university.

In order to evaluate the students' perception of using mobile technology to enhance PDP, a mobile application for Apple mobile devices (iPhone, iPod Touch and iPad) was developed (Figure 1). The selection of Apple mobile devices for this study was made due to their high level of functionality, reliability, usability and design. They also were

more popular amongst the student population at the time of the app development. The aim of the development was to develop an attractive tool that would enrich teaching and learning by providing students with an engaging means of creating, adding and accessing PDP contents on a mobile device. The application was introduced to the users of the Apple mobile devices during the first week of their academic year. No training was given to the HUD iPDP users; however, a user guide was made available to them via the Blackboard VLE, used at the University of Huddersfield.

A questionnaire was generated and pre-tested using a convenience sample of 10 second year IT students using the method described by Cooper and Schindler [16] called collaborative participant pretesting. Data for the main study was collected using an online controlled questionnaire during week 8 of the students' academic year. Incentives in the form of books were provided to participants in acknowledgement of participation in this study and to compensate for the time taken, but they were not promised such incentives before the experiment. One week after the initial call for completion of the controlled online survey, a reminder email was sent to the participants who had not completed the survey. Interviews and focus group sessions were arranged during week 8 and 9.

In the questionnaire, 29 multiple choice questions including demographic questions were set. Most open ended questions from the online questionnaire were also included in the list of discussion topics for the focus group sessions. A few questions were also further explored during the one to one interviews. The following four key questions were asked in this study:

- Which method would you prefer to complete your PDP?
- Do you think the mobile devices can raise your motivation by providing access to your PDP anywhere and at any time?
- Regardless of the mobile device you are using at present, what features would you like to have and what services would you like to access via a mobile device?



Figure 1. HUD iPDP application

- What are your major concerns about using mobile devices in portfolio development?

All responses to the questionnaire, received from three groups, were classified separately to analyse the differences. Students in group A (users of Apple mobile devices) were also asked the following additional questions related to the HUD iPDP application:

- Do you think the HUD iPDP app has helped you in updating the contents of your PDP?
- Was it easy to collect the contents in the form of text, audio, image and video for your portfolio?
- Which features of the HUD iPDP did you find useful?
- Which features of the HUD iPDP did you not like?
- Please provide any further suggestions to improve the app

The last three questions were open questions to collect qualitative information about the developed application.

IV. RESULTS AND DATA ANALYSIS

The response rate from the online questionnaire, interviews and focus group sessions was good. Fifty one students responded to the questionnaire representing approximately 20% of the entire cohort and 69% of the sample group of 74 students. The majority (88%) of the respondents were between the ages of 18 and 25. Table I shows cross-tabulation between groups and their response rates in detail.

The results of the questionnaire show that most students are eager to use an online portfolio system. Those with smartphones had the greatest tendency towards the use of mobiles in the PDP process, perhaps because of their exposure to the app. A multiple choice question was asked from all participants to know their preferred method to complete PDP. Overall, a large majority chose an online portfolio system (67%) followed by an offline electronic portfolio system (53%). However, on analysing the individual results from each group it revealed that the preferred method to work with PDP for the students in group A was online using a PC or laptop (83%) followed by using mobile devices (50%). Table II provides us more detail on students' preferred method to complete the PDP and a visual representation can be seen in Figure 2.

The results summarised in Table II were further explored in interviews and focus group sessions, which revealed that low scores for using mobile devices to organise PDP were

TABLE I. RESPONSE RATES

	Survey	Interview	Focus Group
<i>APPLE</i>	18 (67%)	8 (100%)	7 (88%)
<i>NON-APPLE</i>	17 (63%)	6 (75%)	5 (63%)
<i>CONTROL GROUP</i>	16 (80%)	8 (100%)	8 (100%)
	51 (69%)	22 (92%)	20 (83%)

TABLE II. PREFERRED METHOD TO COMPLETE PDP

	Paper-based	On a PC/laptop offline	Online using a PC/laptop	On an internet enabled mobile device
<i>APPLE</i>	6%	33%	83%	50%
<i>NON-APPLE</i>	6%	47%	71%	35%
<i>CONTROL GROUP</i>	13%	81%	44%	25%
<i>TOTAL</i>	8%	53%	67%	37%

as a result of a lack of synchronisation functionality in the HUD iPDP for the group A, and because of the lack of availability of any suitable application for the students in group B, who were using other mobile devices. Group A was using the HUD iPDP application, which was only helping students in data collection. No online platform was available to students to sync data automatically. Applications were not able to communicate with the Blackboard portfolio system due to a number of security issues. Moreover, it was not compulsory for the students to use Blackboard but they were allowed to create their own online portfolio or use any open source portfolio system available online.

All the students who participated in the focus group sessions and attended interviews suggested that they would have used the HUD iPDP application if more synchronisation functionality had been made available to them. Although two students in group B indicated that they used their mobiles in portfolio development, the large majority expressed disappointment with the unavailability of an appropriate application. Low tendency for using mobile devices in portfolio development among group C was because the idea of using a mobile portfolio was new to them. By comparing the results, it can be seen quite clearly that the students in group A are in favour of using mobiles in portfolio development compared to groups B and C (Figure 2) which is positive indication given the above mentioned grounds.

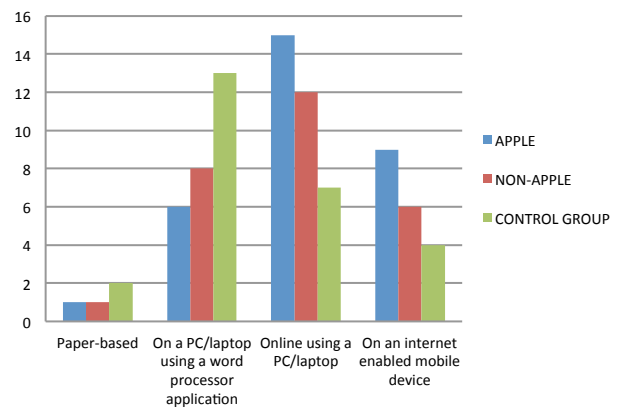


Figure 2. Preferred Method to Complete PDP

The second key question asked was about students' views on the potential of mobile devices in raising motivation for PDP. Four possible answers were given to choose from. Table III shows cross-tabulation survey results from each group, also shown graphically in Figure 3. It is quite clear from the Figure 3 that students are enthusiastic about the use of mobile technology and support its use for portfolio organisers.

The next key question was about the desired feature students would like to have in a mobile application. The data collected suggests that students were keen to see a number of other features to support their studies such as access to Blackboard, learning resources, lecture notes, class timetable, assignment deadlines, feedback on assignments, library catalogue and many more. The overwhelming emphasis, in students' feedback, was that they valued the affordances of mobile technology and were enthusiastic about using it in their university experience.

The last key question asked was about the major concerns on using mobile devices in portfolio development. Syncing data, interactivity, content quality, speed, reliability and security were the options, which were rated (on a scale of 1-5, 1 is lowest and 5 is highest). Students in all groups considered them equally important.

Additional questions were asked from group A (users of the HUD iPDP app). Eighteen survey responses were gathered of which 15 (83%) participants still had the HUD iPDP installed on their mobile devices. Out of 15 students, 14 (93%) used the HUD iPDP application to collect the content for their PDP. Most students found the various features easy to use and were satisfied with the application in general. However, a few students also pointed out in the focus group session and interviews that lack of training in PDP and unavailability of an online version of application with data sync functionality caused low level of engagement with the application. Out of 14 students, 8 (57%) believed that HUD iPDP app helped them in content collection, however, 6 students (43%) did not find it useful. Open questions in the survey, interviews and focus group session revealed that the primary reason for less interest among the students was the data transfer issue from mobile devices to e-portfolio.

A number of issues were identified from the interviews and focus group session with all three groups. This study clearly discovered a demand from students for a coherent multi-functional application with synchronicity and availability of an appropriate application to support the PDP process in different devices. Students were enthusiastic about

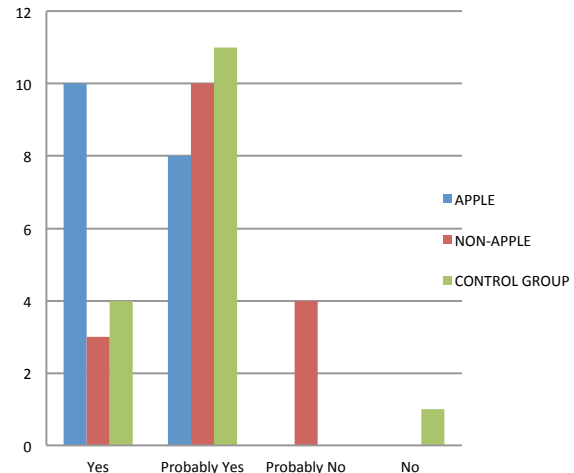


Figure 3. Views on potential of mobile devices to raise motivation for PDP

availability of learning resources on their mobile devices.

V. CONCLUSION AND FUTURE WORK

The research objective was to uncover the potential of mobile technology in portfolio development. A mobile application was developed for PDP to provide an interface for Apple mobile devices and tested to analyse its potential impact on portfolio development. It has been revealed from the students' responses that there is huge interest in the use of mobile technology in this domain. Using mobile devices enhances student motivation, quality of e-portfolio and can improve ease of reflection. However, research on m-portfolios is still in its infancy and needs extensive pedagogical research. More research is required for example to discover if support of m-portfolio for e-portfolio makes a difference in students' engagements with their studies across a range of portfolio approaches. As mobile technology is becoming ever more accessible to students, the knowledge base in this domain needs expanding to understand its true value. Future work would aim to develop guidelines for the use of m-portfolio applications.

A new phase, an m-portfolio project, has started. In addition to making changes in the HUD iPDP application, a bespoke web application will be developed for e-portfolio. This will assist in resolving the synchronicity issue faced with Blackboard e-portfolio system. Another pilot study will be carried out during the next academic year in order to conduct thorough functionality, usability as well as pedagogical evaluations. Feedback via questionnaires, focus groups and interviews will be collected and analysed. One of the main aspects of research will focus on whether using mobile devices in portfolio development raises students' engagement with PDP and enhances its content quality.

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TABLE III. VIEWS ON POTENTIAL OF MOBILE DEVICES TO RAISE MOTIVATION FOR PDP

	Yes	Probably Yes	Probably No	No
APPLE	56%	44%	0%	0%
NON-APPLE	18%	59%	24%	0%
CONTROL GROUP	25%	69%	0%	6%
TOTAL	33%	57%	8%	2%

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