

E-Portfolios for Undergraduate Radiographers

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Portfolios are used extensively in the clinical training of health professionals. They are used to evidence the progress of students and satisfy the quality control required of regulatory professional bodies. Portfolios are also accepted by academics and clinical tutors as a long-established means of assessing students' performance. This paper describes the development of a web-based, e-portfolio for student radiographers. Each student is provided with a secure, password-protected e-portfolio which provides an interactive environment for them to log their learning activities. The e-portfolio is 'owned' by the student and he or she can invite supervisors to share access and sign off work. Additional facilities include a conversation page allowing messages to be exchanged between the student and invitees. Following evaluation, benefits identified include portability of the portfolio for the students, a support system for the student, ease in updating objectives and a secure system of assessment and review.

Keywords student; radiographer; training; portfolio

1. Introduction

As part of their pre-qualifying training, radiography students undertake a fifteen-week hospital-based placement each year of their three year study programme to gain appropriate clinical experience and satisfy professional regulatory requirements. During each placement, students are required to provide evidence that they have achieved set learning objectives through the completion of clinical portfolios. These portfolios come in the form of information and sign-off sheets contained in a large file and consist of a number of clinical objectives, appropriate to their stage of training that the students are required to complete during their placement. In addition, there is a weekly record of their attendance and performance during the placement. Clinical supervisors are asked to sign the portfolios confirming that the students have completed each stage satisfactorily, comment on the student's performance and provide an end of placement report. The portfolios are then returned to the university and marked by academic staff.

At present, the portfolios are provided as paper documents, one for each placement period, and typically run to 70 pages each. Though paper-based portfolios have proved useful for a long time there are numerous drawbacks. Providing a large number of paper documents is expensive, cumbersome and leads to a complex paper trail that is time-consuming for academics and administrators alike to track. There is also the possibility that the portfolio will get lost, be misplaced or damaged, especially in a fast-moving clinical environment. The documents need to be updated to keep the objectives and assessments current and in line with professional practice. This process is driven by student evaluation and feedback from the clinical supervisors and can only occur when the document is being prepared for the next printing run. Practically, this involves a considerable amount of work to ensure accuracy and compliance before printing, as modification to the document afterwards would be expensive and time consuming. The inability to accommodate ongoing change has been identified as a drawback, particularly by clinical staff. Student cohorts typically number 65, and with three cohorts each requiring portfolios every year, there is an obvious financial burden in terms of printing costs. The portfolios need to be signed off by supervisors and students need to physically find their supervisors and get them to sign them off. This action takes up valuable time for the supervisors who are often involved in many other activities and signing-off at that moment may not always be convenient. Finally, incidents relating to the forgery of supervisor's signatures have been recorded.

In consideration of these drawbacks, and because Radiography is considered to be an experiential learning profession, a need was perceived to consider alternative methods to deliver the portfolio content. The radiography authors of this paper (SM & MG) are based in the Faculty of Health and Social Care at the University of the West of England (UWE), Bristol, UK. At the same university in the Faculty of Applied Sciences (FAS), the science authors of this paper (SG & DL) were independently developing an electronic-portfolio (e-portfolio system) for their placement students. Science students, unlike radiography students, are enrolled on a four-year Sandwich degree programme in the

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biosciences, biomedical sciences and environmental sciences. The placement period is concentrated into one year which is typically the third year of the degree. The placements for science students are typically non-professionally based in terms of being accredited by professional bodies. Additionally, the placement learning did not attract formal academic credit contributing towards the degree. Yet, the placement experience involved high level learning and the science authors of this paper decided to produce a pedagogic system that allowed the learning to be captured and assessed for academic credit. The new pedagogic approach to credit-rating placement experience is not the subject of this paper but suffice to say that the system involved the production of individual learning contracts as students go on a varied mixture of placements that could be based in research laboratories, governmental organizations, charities, field centres and hospitals.

In order to cater for this diversity of experience, an e-portfolio system was developed to track, monitor, assess and communicate with students on placement remotely. The e-portfolio system is called Profile (www.profile.ac.uk) and has been funded by HEFCE, the funding body of universities in England and has been running successfully for the last two years.

Profile provides individual, secure, password controlled e-portfolios for students. Students interact with their e-portfolios through web-forms and web-pages and are able to upload evidence of their learning (files in Word, Excel, PowerPoint, pictures, audio, video). Students are able to invite academic and work supervisors to view their e-portfolios and sign-off work. The Profile web-forms are unique as the forms can be configured so that certain fields of the form can be signed off by certain users, such as a sign-off by work supervisors to confirm it is the student that has performed the work to a satisfactory standard and by academic tutors to confirm the work has met certain academic standards.

The Profile system is also unique in that it can handle any type of form and is therefore highly customizable to any situation where forms are used to manage a process. Profile came to the attention of the radiography authors of this paper and a decision was made to adapt and trial this e-portfolio. This decision is in line with recommendations made about Higher Education in the learning society and expanding the role of Information Technology [1], and also concurs with the Department of Health's drive to ensure the global utilisation of information technology within the workplace [2].

2. Portfolio Design

Although the e-portfolio is accessible through the internet (www.profile.ac.uk) the e-portfolio itself is protected through a secure, encrypted login system and in the first instance accessible only by the 'owner' of the portfolio, typically the student. The student can then 'invite' in tutors to view their portfolio and when this is done, each invited tutor receives their own password and login. The student interacts with their e-portfolio by completing web-forms, uploading files and communicating through an audited communication tool contained within Profile.

The Profile e-portfolio contains web-pages (which deliver information) and web-forms (which allow users to provide information). Paper-based portfolios are essentially made up of pages that provide information and forms that need to be completed. The similarity of both systems means that paper-based portfolios can easily be migrated to Profile. However, the paper-based pages and forms need first to be converted into web-pages and web-forms. A number of computer programs perform the task of producing web-pages and web-forms. A common one is Microsoft® FrontPage™ which often comes bundled in Microsoft® Office™. Another common program, preferred by web-developers, is Macromedia® Dreamweaver™. Both programs are accessible to ordinary computer users and with some practice even novice computer users can produce web-pages and web-forms.

The radiography authors of this paper converted their paper-based portfolio into web-pages and web-forms using Macromedia® Dreamweaver™ and uploaded these into Profile. Students are then able to view these pages and interact with this environment to record and electronically store their work on their clinical objectives. From their home page, students can navigate via hyperlinks to each objective and record their work in free-text boxes.

All entries into the web-forms is stored in a database so when the students return to complete their forms, their earlier entries can be viewed. Once they have completed the tasks they then submit their work for review/markings.

The clinical and academic supervisors are invited by the student, via e-mail, to share access to the material in the e-portfolio. The supervisors can then read and sign off the student's work in a security level not accessible by the student.

A second section within the portfolio provided for weekly reports of the student's attendance, learning experience and comments from the clinical supervisors. Finally there a section for an end of placement report. Students are able to add their own comments in both these sections through free-text boxes. Additional facilities within the portfolio include a conversation page allowing messages to be exchanged between the student and invitees.

3. The Project

The e-portfolio project involved a population of final year diagnostic imaging students (n=54). Due to a wide variation in the standard of IT provision throughout the clinical placements, inclusion for the trial required the participating hospital to be able to offer the students good, and free, access to the Internet. Four of the clinical placement hospitals meeting this requirement agreed to participate. All students from the population placed in those hospitals were included in the sample (n=24). Changes were made to the paper-based system requiring those students still using it to word-process their work and submit it in a portfolio folder. This ensured that those participating in the project would not be disadvantaged by losing the option to handwrite their work.

4. Training and Support

Student support in any online activity is considered essential [3]. Prior to going out on placement, the participating students were given an introductory workshop in an IT laboratory, facilitated by the Faculty of Applied Science. This enabled them to contextualize the material and familiarise themselves with administrative procedures such as logging on, submitting completed work and inviting supervisors to share access. Supporting documentation was provided as a handbook summarising the learning points of the workshop, detailing administrative procedures and providing information on where to seek help and technical advice.

All clinical supervisors and link lecturers participating in the trial were given on-site training prior to receiving the students. As well as enabling them to interact with the portfolios in their supervisory role, provision was made to enable supervisors to provide some technical support for the students. Again, an accompanying supervisors handbook was provided for reference.

The lead lecturer at the University was clearly identified to all students and clinical supervisors as being the first point of contact, via e-mail, to assist with issues that could not be resolved in the placement hospital. Appropriate academic or technical support could then be organised.

5. Evaluation

All stakeholders were invited to participate in a preliminary evaluation of the trial via e-mail. In the meantime, work is being conducted on the development of a full evaluation tool. It has been decided that the most appropriate method of evaluation will be to use a questionnaire. This method is an inexpensive method of obtaining information not only about the experience as a whole but also about individual system components [4]. The questionnaire will be set up as a web site hosted by the Faculty of Health & Social Care in the University. It is designed to evaluate four aspects: the online experience, technical issues and support, the handbook and a final section for free comment. The questionnaire design includes binary type questions with two possible answers (e.g. yes/no) string type questions, allowing free text replies, as well as the use of ranking scales. Students, supervisors and academics will be assigned a unique number to prevent double entries and will be directed to access different pages of questions specific to their experiences. The advantages of conducting the evaluation online include the use of a single document, easy distribution to all stakeholders via e-mail and online completion and return. Data from the completed form will be sent via CGI as an e-mail to the lead lecturer.

6. Results and discussion

The response rate to the preliminary evaluation was very high (87.5% students, 100% clinical supervisors and 100% Academic staff).

All of the participants responded favorably to the e-Portfolios. Both the students and the clinical supervisors found the asynchronous nature of data entry appropriate to the clinical environment and less demanding on their time than the paper-based version. Students remarked that the e-portfolios made it much easier to record and catalogue their work using the web-forms and commented positively about the long-term portability of the portfolio as a tool for continuing professional development once

qualified. The messaging system was found to be beneficial by both students and supervisors, allowing a more co-ordinated approach to completion and review of the portfolios. All the supervisors found that reviewing the students' work and report writing was much easier online and could be done at a time that suited their workloads. Although some academics found online marking a challenge, they considered that this would improve with experience.

The updating and amendment of the e-portfolios following evaluation has been identified as a considerably easier and cheaper process than that previously experienced with the paper-based system. Web pages and web-forms can be altered using Microsoft® FrontPage™ or Macromedia® Dreamweaver™, and uploaded to the Profile site allowing changes to be readily incorporated. This will also ensure future curriculum changes are effectively encompassed.

Technical support was acknowledged by all parties as being good. The introductory training sessions were identified by all groups as being appropriate and useful. A number of small changes were recommended for the handbooks which will be incorporated in future versions, including the provision of an online help facility. A small number of students (n=4) experienced difficulty when they tried to access their portfolios for the first time due to incorrect entry of their user name or password but these issues were dealt with by the clinical supervisors. Several queries regarding procedural issues were raised by both students and supervisors during the project and these were readily resolved by the support team.

The project was trialed in clinical placement hospitals offering good IT access for the students. It is recognized that other hospitals used by the university within the placement area are not able to offer the same levels of access thus compromising the students' and supervisors' participation in the e-portfolio project. This is a major problem that Faculty of Health & Social Care at the university is aware of and is currently addressing however issues still exist concerning the location, security and maintenance of computer terminals, together with the ownership of the telephone line and internet access from behind hospital intranet firewalls.

7. Conclusion

E-portfolios have been favorably received by all parties and the project has highlighted many benefits of e-portfolios for student radiographers on clinical placement compared with the traditional paper-based system. These include ease of data entry, the long-term portability of the portfolio for the students, ease in updating objectives and a secure yet accessible system of assessment and review. Additional benefits include an asynchronous communication and support system for the student and the reduction of the paper tail.

Following the positive evaluation of this project, the long term decision has been made to replace all paper-based clinical portfolios for student radiographers with the Profile system (once the issues of internet access have been resolved). The results of this trial have been disseminated within the Faculty of Health and Social Care and it is known that other health professions who use portfolios for students on clinical placement are considering a similar solution.

Within the School of Radiography, work is underway to convert the first and second year students' clinical objective portfolios to web pages and web-forms for uploading to Profile. Additionally, there are plans to further develop the e-portfolio to include the recording of clinical assessments online although there are currently issues regarding the accessibility and functionality of a suitable system

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