RAPID DEVELOPMENT OF AN ELECTRONIC LOGBOOK TO SATISFY STUDENT PRACTICUM ON PLACEMENT IN AUDIOLOGY

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Abstract   The use of technology by academics in teaching learning and assessing in higher education has become increasingly important in the early part of the 21st century. In this paper the author traces the literature in the area of electronic logbooks (ELBs) also referred to as ePortfolios and presents a case study on how a turnkey solution to deploying an electronic logbook was achieved in a short timeframe for audiology students at Athlone Institute of Technology

1. Introduction

"When planning for a year, plant corn. When planning for a decade, plant trees. When planning for life, train and educate people" [1]. The BSc (Hons) in Audiology in Athlone Institute of Technology (AIT) is based on practitioners quality practicum developed by eight British Universities in line with professional standards upheld by the British Audiology Association (BAA) [6]. AIT had acquired rights to use the paper version of the logbook. In order to maintain the BAA standards AIT had committed to developing an electronic log book (ELB) [3]. The development of ePortfolios in medical education to facilitate learning and capture assessment [4] has happened in line with the move to blended learning in Higher Education in recent times. Development of the BSc in Audiology in AIT followed a long period of a dearth of undergraduate education for audiologists on the island of Ireland. AIT had carried out an amount of work on the development of the BSc in Audiology prior to the publication of the Health Service Executive (HSE) National Audiology Review [5] in 2011. Audiology training involves the acquisition of practical competencies and knowledge in the functioning of the auditory system in human beings. Audiology students develop these competencies in college first and then progressively improve them on their placement practicum. In this scenario audiology student undertake a yearlong placement. For the undergraduate audiologist this involves mastering skills in up to 35 different competencies. The audiology student has three levels in which to perform a competency. These levels are observation, participation and fully demonstrated [6]. The size of each student's record of up to 6000 data fields, obviated the need for something other than a paper based logbook given the amount of detailed data involved. Practice tutors and practice educators support assist and monitor audiology students' progress while mastering these competencies in clinical placement.

2. Literature Review

Portfolios are an essential tool for demonstrating professional accomplishments and documenting personal growth in a variety of professions particularly in healthcare in professions such in medicine and nursing [2]. In the new era of patient centred healthcare [21], [22], [23] with the emphasis on patient safety the question of professional competency is to the fore. Traditional paper based [2], [9], [14], [15], [16], [19], [20] logbooks of competencies are fraught with risk of error even from simple issues such as a clinicians handwriting or a logbook being misplaced. In addition the question of visibility of progress through placement practicum from stakeholders such as placement module leaders, practice tutors and students is limited where the practicum logbook is paper based. Paper based logbook are also inadequate from the perspective of integrating data for analysis [2], [9].The emergence of ePortfolios / electronic logbooks (ELBs) is seen as an important advance in management of competency based medical education [7]. Tochel et al [18] describe ePortfolios as a collection of student work, which provides evidence of student learning, while giving clear guidance on assessment. They conclude from their study that ELBs when implemented correctly encourage increased personal responsibility for learning and have benefits for reflection and continuous professional development.

Paper based versions of logbooks have existed in professions like nursing and medicine for quite some time. Paper based logbooks may restrict collaborative feedback between practice tutors, placement module leaders and students due to the lack of visibility to all stakeholders concurrently. Collaborative internet based networks are extremely flexible [8] and amenable to all stakeholders in the management of the student learning continuum where placements are spread over a wide geographical area. Dynamic sharing of data in a seamless manner is important in the efficient assessment of student progress on placement but sharing of data in paper based systems can be problematic [10]. In figure 1 below the dynamic flow of data to and from the individual clinical place record (IRCP), in this case study, necessitates live data being up to-date for all involved in real time. Many health professionals now view assessment using electronic logbooks / ePortfolios as fundamental to student progress through placement from novice practitioner to new professionals. An ELB provides the required visibility over time to allow for integrated assessment and student feedback when required ELBs enable students to acquire the competencies more efficiently which in turn allows them become new professionals [2], [4], [7], [8], [9], [11] used to a portfolio type passage through their training. This in turn establishes a good foundation for continuous professional development (CPD) for the healthcare professional.

Where the amount of data to be gathered is extensive and detailed, in this case study up to 6,000 data fields per student, the ELB is of huge advantage in that it can enable drilling down through keyword search to the particular competency required very quickly. Not only can ELBs allow for initial training they may also be easily scaled for data capture for CPD throughout

the healthcare professionals working life. CPD is now becoming part of the requirements demanded by regulatory bodies to allow professional healthcare workers continue in practice and is linked closely with patient safety. ELBs support the patient safety theme from this perspective [8].

Electronic Logbook Data Flows

Placement Module Leader

Practice Tutor

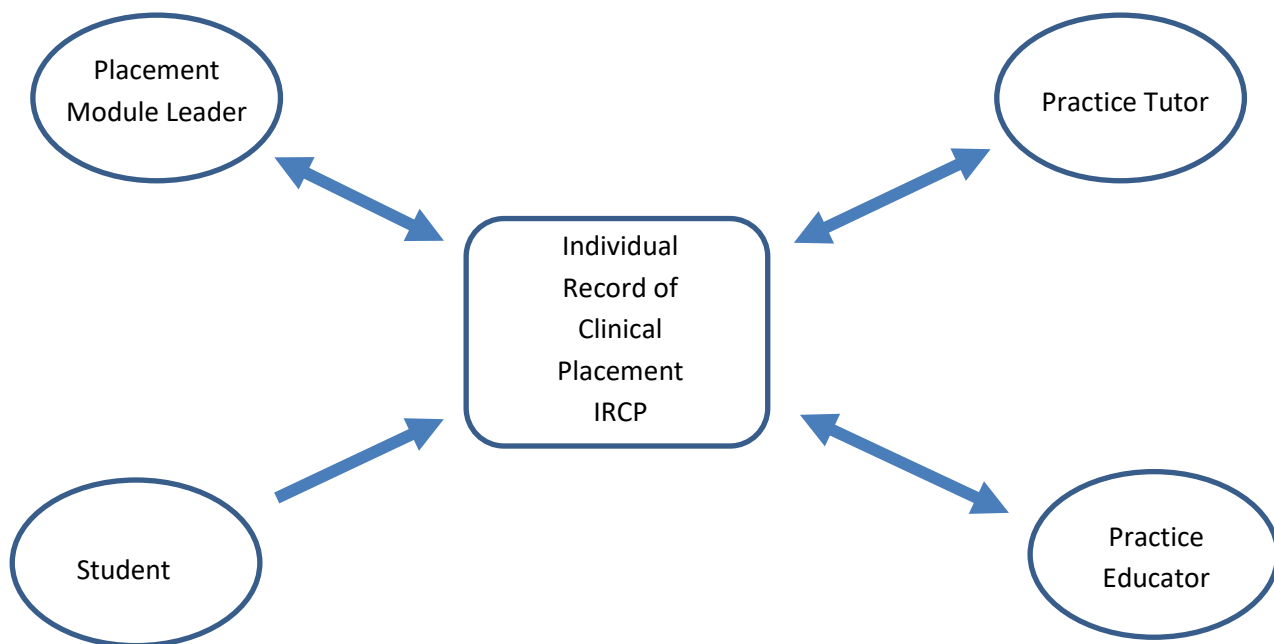Individual Record of Clinical Placement IRCP

Student

Practice Educator

Figure 1 Audiology Logbook Data Flows.

The ELB also acts as a repository which may be of benefit to the student after qualification such as when they are seeking employment [12]. Briceland and Hamilton [11] conclude that the ELB can be valuable to show achievement in competency based outcomes. Competency standards are an ideal fit for ELBs [13] in that they are fixed measures of progress or milestones through a student's clinical training experience. National based standards such as the use of the MAINPORT [7] CPD system in medical education in Canada further underpins the acceptance of ELBs in the initial training and continuous professional development (CPD) of medical and allied healthcare staff. Sehmbi and Shah [14] outline how the use of an ELB in anaesthetist training is extremely critical given the unreliability of the paper based version used in many of 236 medical colleges in India. Brouwer and Kiroff [9] attest how the use of an ELB allows for a more accurate and informed assessment of a medical student. Fitch et al [15] advise in their discourse that the ELB is extremely useful from the perspective of analysing results and making comparisons statistically on outcomes therein. In their paper on teacher training Jun et al [16] found that the use of ELBs enabled the trainee teachers to have a keener understanding of the standards required of them. While Strickland and Islam [17] espouse the virtue and benefits of using ELBs in assisting with the teaching and assessing of the Canadian Medical Education Directives for Specialists (CanMEDS). In summary the sample papers perused here all extol the virtues of ELBs over paper based systems from many perspectives for example patient safety, professionalism, data analysis and CPD.

3. Developing a Solution

The problem needing a solution in this case study was the conversion of the paper based National Audiology Clinical Placement Logbook [6] into an electronic format that would satisfy the various stakeholder groups data flows identified in figure 1 above. A typical paper record of a single competency is shown in figure 2 below [6]. Each record contained up to 35 competency attempts.

The timeframe for deployment of this ELB was 6-8 weeks. The material available to the author at the outset was a word based version of [6]. Each student record had 331 individual line items required for the completion of his/her competency logbook. The HSE audiology lead in Ireland had come from the UK system and was expecting the functionality of UK BAA & universities computer based system.

Patient Preparation	Level	Date completed, initial & comments									
		1	2	3	4	5	6	7	8	9	10
A) Prepares the clinic room(s) ensuring that all the required resources are available and that the room and test environment are safe	O										
	P										
	FD										
A) Ensures that all equipment is working correctly and safely. B) Where appropriate performs stage A equipment checks or required calibration and records	O										
	P										
	FD										
A) Checks the patient identification details, identifies self to patient. B) Outlines reason for appointment and aims of the session, checks consent.	O										
	P										
	FD										

Figure 2 UK National Audiology Clinical Placement Logbook Sample Record.

So the main requirements arising from stakeholders were the following:-

- Practice tutors be allowed update all preparation, performing and interpretation at all levels of observation, practice and fully demonstrated pertaining to students allocated to him/her
- Practice educators be allowed the same functionality as practice tutors save for fully demonstrated pertaining to students allocated to him/her
- Students be allowed to view their own record so that they could monitor their progress on placement
- Placement Module Leader be allowed view all student records so that they could monitor all students progress on placement

The possible solutions open were the following. First the possibility of using the paper version [6]. This was discounted as being impractical and contrary to the commitment made in Professor Armstrong-Bednalls report [3]. Next the functionality of Microsoft Excel was explored to see if it could be adopted. This again was discounted as the functionality therein did not come near to meeting the specification required. The Department of Nursing and Health Science in Athlone Institute of Technology through its pharmacy technician programme had been using Student Diary Pro (SDP) an ePortfolio solution which was developed as add-on to Moodle © for some time. However although this was a useful solution for pharmacy technicians its adaptation to audiology students placement was found not to practicable due to specification requirements. The author then looked at the possibility of employing an external company to develop an ELB which would meet these requirements. Two such companies were engaged with, but timeframes and costs discounted these options. Finally the author investigated the possibility of developing a bespoke solution. The author having looked at the functionality required determined that a minimum the following elements needed to be part of the solution:-

- A relational database was required here which could cater for all the various security levels
- This solution needed to be online as audiology students would be spread over a wide geographical region during their placement
- Web based ease of use for deployment and integration with Moodle © was also important
- The chosen platform had to fit within a small budget
- The chosen platform had to be well established something which could be demonstrated by the evidence of a significant customer base.
- Rapid prototyping and systems development were also key given the tight timeframe

The author decided a web based / cloud database platform might fit these fundamental requirements. After about a week's research Caspio © was chosen as the platform to use. Caspio © is an unconventional Silicon Valley technology company specialising in cloud based platforms. Caspio © was chosen as it met all the fundamental criteria identified above. It also offered a free trial period which allowed time for prototyping and getting user buy in before any financial commitment was made to purchase.

FIRST NAME	SURNAME	SECTION NAME	SUBSECTION	TASK	MINIMUM_ATTEMPTS	LEVEL	D 1	PR	D 2	PR	D 3	PR	D 4	PR	D 5
Joe	Bloggs	A1 Pre Session Preparation	Room Preparation	A) Prepares the clinic room(s) ensuring that all the required resources are available and that the room and test environment are safe		O	05/01/2015	1	14/01/2015	1					

Records 1-1 of 1

Logout

Figure 3 Electronic Clinical Placement Logbook Sample Record.

Next the development stage began. The first step was to convert the word version of the logbook [6] to a Microsoft Excel © workbook. The reason for this was that the Caspio © system could import data in this format and at go live time it was estimated that around 3600 records would have to be imported as efficiently as possible. In Caspio © a project was setup and the various related data files were created. Next the security and authentication for the various stakeholder levels identified in figure 1 were established. Finally what Caspio © call 'data pages' were set up for each stakeholder view/update. Next some dummy data was loaded and functional testing of the solution began soon thereafter. When the author was happy with the functional testing a prototype of the ELB was created and used during a training day in the college for practice tutors and practice educators in order to facilitate user acceptance testing. The practice tutors and practice educators were satisfied with the prototype system after the user acceptance tests, which enabled the green light to proceed with full deployment. A user manual was prepared and uploaded to Moodle ©, the VLE used at Athlone Institute of Technology. Next the various 'data page' views were deployed to URLs. These URLs were embedded in the programme education pages for practice tutors and practice educators in Moodle ©. Finally go-live data was loaded and the ELB went live. Figure 3 is an example of a student competency record on the live ELB.

4. Conclusions

Many papers viewed in the literature [2], [9], [14], [15], [16], [19], [20] outline the increasing use of ELBs as part of clinical competency training for healthcare professionals. The question of quality control in training in competencies is coming increasingly under the microscope from various stakeholders such as funders, the professions themselves and service users. The sample papers perused in the literature review, in general espouse the positive attributes of ELBs over paper base systems. Deficits in areas such as data analysis and traceability in paper based system were traced through and highlighted earlier in the discussion. In addition it was shown that paper based systems are extremely cumbersome when it comes to stakeholder visibility in the clinical competency training environment. Advances in information and communications technology (ICT) in recent years, particularly in the domains of infrastructure, relational databases, web technologies and cloud based computing solutions have enabled platforms to emerge which can allow rapid deployment of solutions such as ELBs. This paper is an example of a case study of the deployment of an ELB for audiology students undertaking a yearlong clinical practicum. This case study clearly delineates the use of a rapidly deployed cloud based technology solution into a clinical education setting. The platform identified and used in this case study is Caspio ©. This paper also found that the use of ELBs is not only beneficial in the initial competency based training of healthcare professionals, but the literature advises that ELBs have a very significant role to play in CPD for the entire career of the health care professional.

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