HELP! I'M A NON-SPECIALIST, GET ME OUT OF HERE: DESIGNING SUPPORT MECHANISMS FOR THE NON-SPECIALIST

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Abstract

The BioLab project focussed on the external circumstances affecting the cognitive behaviour of new or non-specialist teacher and investigated what supportive mechanisms were required to facilitate the move from the early 'survival' phase to the more pedagogically effective 'maturity' stage. This paper explains the outcome of the research, the success of the resources developed and how this approach can be used within the context of any subject area to support non-specialist teachers and tutors.

Introduction

This paper will provide: background theories and models; how content should be produced and evaluated; the problems associated with differing delivery formats; the pedagogical approach; and how to widen the appeal of the finished product. All findings come from research associated with the BioLab project — an FDTL5 HEFCE funded project that produced resources for Biomechanics non specialists (http://www.biolab.org.uk). The project aimed to develop a teachers' resource to improve accessibility and enhance the quality of sport and exercise biomechanics teaching and learning within sport-related degree and HND courses. The development of a teaching and learning Toolbox aimed to facilitate an increase in the opportunities for students to study biomechanics. Each module had content presented in the form of lectures, laboratories and tutorials and also had assessment exercises, multi-media files and internet links to other supporting materials.

Theories and Models

It is now accepted that provision of IT resources to students helps in their development by providing self study materials that can be assimilated at their own, individual pace; similarly IT resources can also be provided to teachers and non-specialist to facilitate their development. However, developing resources is a lengthy and expensive exercise, but if made flexible enough they can be used in a variety of different ways in order to bring added value to a greater target audience.

There are a variety of models and theories surrounding teacher development: some have a holistic perspective whilst others deal only with the first year or so where

more time is needed to "gather resources, create lessons, develop classroom routines, assess student progress and find effective ways to maintain records" (Renard, 2003). What all models and theories do agree on is that the development moves from the concrete to the abstract and from the personal to the philosophical.

One of the best known models comes from the developmental theorists Fuller and Brown, who described a model based on three stages of concerns a teacher is believed to pass through when first training: self concerns, concerns about the task of actually teaching, and finally concerns about the impact their teaching may have upon pupils (Fuller, 1969; Fuller & Brown, 1975). Although developed around research into subject specific teaching, Fuller's model is widely accepted as affording insights into the stages that new workers from any profession pass through (Owens, 1992). Lidstone and Hollingsworth (1992) looked the early years of teaching, and found a similar cycle concerning the implementation of pedagogy. The elements within this cycle can be seen as three stages of cognitive attention: management focused, subject/pedagogy focused, and student learning focused (Gould, 2004). In the first stage, the teacher has knowledge of pedagogy but no experience in its application; at the second stage the teachers recognize the concept but cannot effectively implement it into their work; the final stage is that of a deep knowledge and understanding of the pedagogy, along with the contexts in which it can be used in the most effective manner. A more granular model is proposed by Moir (1990) which describes five phases a new teacher passes through within the first year of teaching: anticipation, survival, disillusionment, rejuvenation and reflection. Again, it is only within the latter stages of this model that the new teacher begins to address the curriculum and the needs of the learners.

Katz (1972) proposed a model that is still accepted today, and focused on a teacher's development within the first critical five years. Her model identified four development stages: survival, consolidation, renewal and maturity. Along with identifying these stages, Katz also suggested ways of supporting the teacher during each part of the cycle (see Figure 1).

During the "survival" stage, the teacher is self-centred and prefers to have students in passive roles rather than active participants in the learning process (Stoot, 1998). In order to support the teacher during this time they require resources to help them develop and present their lessons, with specific suggestions regarding how the materials can be used to meet objectives (Stoot, 1998). At the second stage, "consolidation," the teacher begins to look at ways to develop their instructional skills and requires a wide range of resources in order to have materials and ideas ready to meet specific need (Stoot, 1998). During the "renewal" stage (usually the third or fourth year), the teacher is competent with their teaching abilities and now require new ideas, resources and materials that will allow them to expand upon this skills base. The final "maturity" stage sees the

teacher looking at more philosophical questions and how they can affect or impact upon teaching in a wider sense. They are still interested in new materials and resources, but are more likely to use them in variety of ways and situations. This cycle is not always linear, and different teachers will move through them over different timescales. Due to external circumstances a teacher may even regress to an earlier stage if, for example, they were given the task of teaching in a different subject area.

Figure 1: Stages of development and training

Developmental stages	Training needs			
	Year 1	Year 2	Year 3	Year 4
Stage 1: Survival	On-site support and assistance			
Stage 2: Consolidation	On-site assistance, access to specialists, colleague advice			
Stage 3: Renewal	Conferences, associations, journals, magazines, films			
Stage 4: Maturity	Courses, journals, conferences.			

Modified from Katz (1972)

There currently appears to be an upward trend towards teachers being placed into a situation whereby they are being asked to teach a subject that is not familiar to them, which leads to concerns on behalf of the teacher. One of the most well known models that conceptualise this problem is the Stages of Concerns model by Hall (1977). Chung (2002) divides the seven stages described by Hall into three focus categories: Self, Task and Impact. Each progressive stage moves away from the inward looking, selfish approach to the more developed approach which looks at how teaching will impact upon student learning.

This model can be seen to relate to those described earlier from Fuller and Brown (1975), Lidstone and Hollingsworth (1992), Moir (1990) and Katz (1972) in that it moves from the egocentric, personal, concrete ‘survival’ stage, to a more student-centric, philosophical, abstract ‘maturity’ stage. All models are also multi-dimensional and developmental constructs that can be synthesised into a general understanding of what occurs during the early years of a teacher’s professional development.

Figure 2: The Stages of Concern model

Focus	Stages
Self	Awareness Informational Personal
Task	Management
Impact	Consequence Collaboration Refocusing

Adapted from G. E. Hall & S. M. Hord (2001)

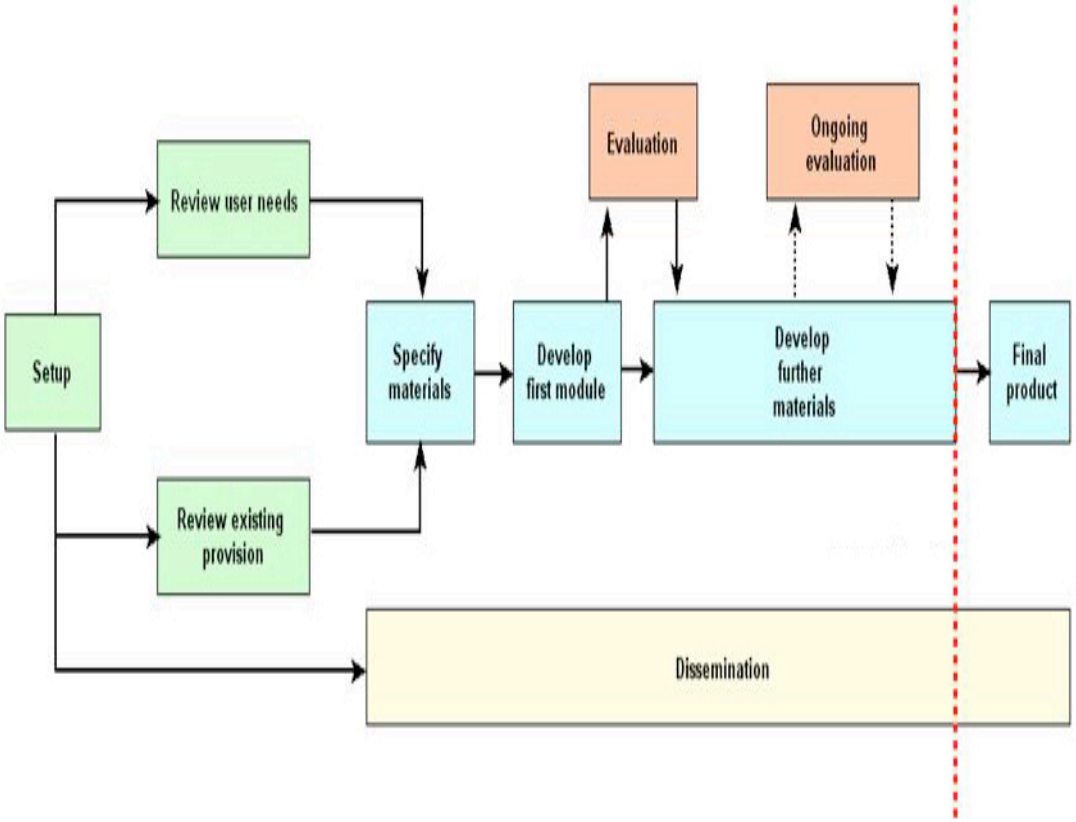
What is a Non-Specialist?

Teaching a subject in which one is not a specialist is one of the main concerns that causes focus upon the self, and relates both to new teachers as well as experienced teachers who are tasked with teaching as a non-specialist. Research into the definition via literature review revealed very little work in the area and a degree of ambiguity surrounding its meaning; the only area having direct reference being research into Professional Identity. The project's classification of a new teacher was agreed to be one with less than three years experience, but identification of a 'non-specialist' caused problems due to difficulties in defining what the term actually encompassed. Personal interpretation was the best guide as it indicated a level of confidence and therefore is directly associated with Hall's model.

Content Production and Evaluation

Earlier in the project lifecycle, five areas were identified within Biomechanics that comprise the core elements of the subject and the types of teaching resource used for each: these were lecture notes, tutorials and laboratory exercises. Using this data it was determined that the creation of a 'toolbox' of resources would best support the needs of the community as proposed by Dyal and Sewell (2002). This approach was supported by a research methodology aimed at discerning patterns of use and to collect qualitative statements regarding the use and improvement of the various components (Petersen & York, 2003).

Figure 3: Research methodology design



This approach can be situated within the design-based research paradigm (Barab & Krishner 2001; Sandoval & Bell, 2004; Shavelson et al., 2003). Design-based research is carried out in a continuing cycle of design, enactment, analysis and redesign (Design-Based Research Collective, 2003). The main aim of the early evaluation was to obtain data that will feed into the analysis stage of the design cycle, which was used to redesign the content and delivery of the learning materials. This was achieved via a questionnaire, supplemented by one-to-one interviews to obtain qualitative data and the results were analysed and used to modify module one and create module two. The next stage of evaluation used the same data collection approach, but concentrated on the areas of pedagogy and usability. Once these incremental evaluation exercises were complete, the final beta version of the Toolbox was distributed amongst a small evaluation group of twelve, working in both Higher and Further Education, for use in class.

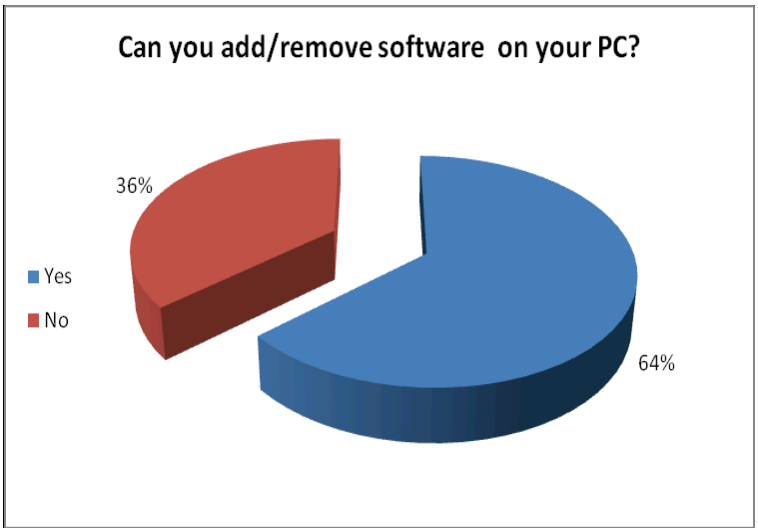
When the product was distributed for use, it was found that merely providing appropriate content was considered highly supportive: “With my workload and commitment in other areas, this level of materials would have been years off.” The materials also helped the non-specialist understand the area they were to teach,

enabling movement from the survival approach to a more mature stage and allowing focus on pedagogic aspects of teaching: "It's been really useful because a lot of them are visual learners, so being able to get it across in that way has really helped." This conforms to the approach proposed by Stroot et al. (1998).

An 'Open' Resource

It was an early decision in the project that all content should be open and available for modification, not just to allow for conversion to another file type (should this be necessary), but to also allow for modification by the different experience levels of the users. This was perceived as a major benefit and led to the use of the materials in a manner would not have been possible if they had been inaccessible or 'locked down.' The only concession made by the user is to display on all modified content the source of the material and the copyright owner. (Figure 4)

Figure 4: Can you add/remove software on your PC?



Electronic Formats

Early development of the BioLab materials produced files in a limited number of formats. However, it was found that a wider variety of file types were in use and this was not only associated with differing operating systems, but also with historical variances within a single proprietary system. This caused a number of problems, especially with the multimedia where more technical difficulties were encountered. Upon further investigation it was found that many of the users (36%) did not have the necessary privileges to be able to download and add the software updates or codecs necessary to play the files. The only way to avoid this problem

is to embed all media into a stand-alone application; however new developments in operating systems require the correct user privileges to allow software programmes access to core system resources necessary to use them and raises a further technical problem that needs to be overcome.

An 'Open' Resource

After much discussion in the evaluation group, it transpired that files should be made available in an 'open source' format so that they can be modified or imported into a wide variety of programmes or platforms. An open format is a published specification, free of legal restrictions on use. The primary goal is to guarantee long-term access to data without current or future uncertainty with regard to legal rights or technical specification (Wikipedia, 2008). However, current file types for the most popular programmes should be included to minimise conversion problems that may be encountered by less competent IT users. Further work in this area is required to identify a usable solution to this problem.

Pedagogy

The model developed by Hall (2001) and adapted by Chung (2002) states that a teacher goes through a linear development process that moves from the 'self' to 'impact' stage. As new teachers and non-specialists were the immediate target audience for the BioLab Toolbox, it was assumed that they would be in the survival, 'self' category of the development process and would therefore want content that supported and scaffolded delivery of their subject as proposed by Stoot et al. (1998).

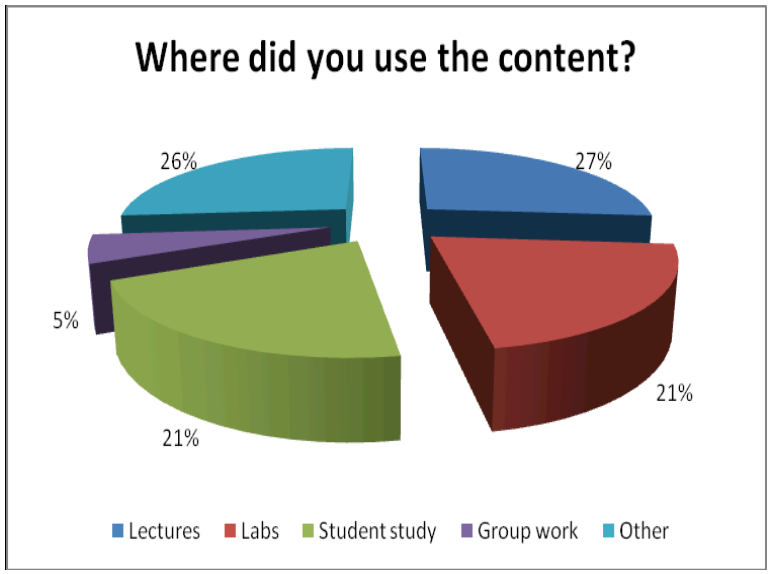
When the project undertook to research this area, it was found most non-specialists supported a didactic approach to content delivery (group work accounted for only 5%), as it necessitated a lower level of teaching experience in order to meet curriculum needs: "It's just simpler, you just need to look through it and get on with it." (Figure 5)

Encouraging Wider Usage

Whilst the resources were focussed on providing necessary support for new teachers and non-specialists, this group is only one part of the larger subject specialist teaching pool. In order to appeal to a wider user group the Toolbox included some very specialist content. These were still designed to be usable by the non-specialists, but had the added value of providing a new resource for the specialists. The original content was modified by this group in a very mature

manner; by creating reusable learning objects and online support resources for students. This type of activity falls into the Impact stage of the model developed by Hall (2001) and is a more mature, pedagogically orientated use of the materials, only possible because the content within the resource was designed to support such an approach.

Figure 5: Where did you use the content?



CONCLUSIONS

With the increasing pressure on all educational institutions to reduce costs and provide niche subject courses, new teachers are often deprived of the support they need and experienced teachers are finding themselves in a position of teaching a subject in which they are a non-specialist. Providing the correct type of resources to support both of these groups is not currently embedded within content production aimed at this target audience, and the following outcomes need to be adopted to ensure a teacher's move from survival to maturity is as quick and efficient as possible:

- All content needs to be easily accessible and modifiable, therefore providing it in an electronic format is the most effective and efficient delivery medium.

- The content needs to be provided in a number of different formats in order to meet the needs of the users who have a diverse hardware profile.

- The pedagogical design of the content should be didactic in nature, but have the flexibility to be used in a variety of classroom situations, including self-study.

- Clear pathways for teaching the subject area should be provided in order to guide and support the teacher in their course planning and design.

- All content should be of the highest quality to appeal to the widest audience so that experienced teachers will also adopt the content.

It is hoped that this paper will provide guidelines for IT content developers so that they get the best return on their investment in terms of usage by the target audience, and that new and non-specialist teachers are provided with appropriate supporting content to help in their progression from surviving to maturity.

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