Project Report: "e-Notes for Engineers"

Dr Antonis Giannopoulos,

School of Engineering, Institute for Infrastructure and Environment, AGB Building, King's Buildings, email: A.Giannopoulos@ed.ac.uk

Background

The objectives of the project "e-Notes for Engineers", supported by a Principal's Teaching Award, where to investigate the possibility of using processes, currently employed in producing high quality e-books and especially interactive text books that are available for Scientific and Engineering topics, to create handout and course notes normally given to engineering students as part of their course material. Notes for engineers often contain technical material and concepts that can benefit from a form of dissemination that is interactive and can explain the topics better for the students.

The fundamental premise for the project was to establish if it was going to be possible to create a process based on the availability of suitable software tools for academic staff, involved in the creation of engineering student handouts and course notes, to use to easily create e-Notes that will be more engaging and useful to students than the current practice of handing out PDFs and of preprint of lecture or tutorial slide-sets.

During the life of project some of the investigators had to move away from the University and as a result some adjustments had to be made and some delay in the project's timeline was introduced. The project team consisted of Dr Antonis Giannopoulos and Mrs Victoria Dishon. Nonetheless, the objectives of the project were met and both interesting academic research and practical investigations took place over two years. The project engaged with IT professionals and interns (supervised primarily by Mrs Dishon) as well as working with final year project students that engaged with the topic under the supervision of Dr Giannopoulos.

Early on it was decided to make a priority the requirement for using, as far it was possible, tools that can produce suitable electronic publications in open and widely accessible format (ePub v3). The reason for such a decision was the obvious appeal of a wider aspect of delivery to students, as this material was meant to be accessible by students' tablets and mobile phones under a "Bring your own device" (BYOD) assumption. Making e-Notes accessible from such devices was established as a priority early on when discussions with students took place at an initial scoping stage of the project.

Results

The key findings of the project are summarised below:

- Currently there are no easy to use tools available to academics with no specialist training on IT to create such material in a widely open format (ePub v3). Research indicated that the amount of effort and computing programming expertise that will be required is not contusive in adopting a process of creating e-Notes or converting existing material by staff without significant effort.
- Research on the potential uses of such technology indicated that there is a case for engaging with this practise and modernise and enhance accessibility, as originally thought when the project was conceived [1]. So, the reason for not actively promoting further the adoption of creating material in that form is primarily a technological one and specifically the absence of easy to use tools.

- Using existing technologies, but accepting the limitation that any material produced will only be available to specific mobile devices and specifically to ones operating under Apple's iOS system (iPads and iPhones and Mac OSX), it is possible to create engaging material.
- A pilot for such process delivered a set of e-Notes covering material that is part of a course in Land Surveying (2nd Year Civil and Environmental Engineering curriculum, Course Organiser Dr A. Giannopoulos) have been created. The process used the "iBooks Author" software package and as a result the material can only be available to users of iPhones, iPads and Mac OSX computers. Figure 1 illustrates the title page and contents page of the e-Notes pilot notes.



Figure 1 Front cover and Table of contents of e-Notes for Engineers in Surveying

Recommendations for future work

From the research work carried out during the project it became apparent that the idea of engaging with interactive material instead of using "flat" PDFs and printed handouts it can enhance the student experience and facilitate learning new and complicated concepts better as they can be explained more clearly using interactive elements (animations, video, etc.)

The current state of available tools directly to academics does not make this process a currently viable option for wider adoption but rather an option for people with computing expertise that can combine elements together to create the required material in an openly accessible format. Tools that are currently available allow for a relatively easily adoption route albeit only for a specific operating system and make of devices (Apple iOS and Mac OSX).

As technology moves rapidly in this area of e-learning it is expected that more tools will be made available to end users for adoption and it is the recommendation of this project that using them will benefit the learning experience of students.

References

[1] Margarita Skarkou, (2015) "An investigation into the potential uses and benefits of technology in improving student learning and experience in Engineering higher Education", MEng Thesis, Civil Engineering, (supervised by: A. Giannopoulos)

[2] Oliver Armstrong and Roland Debbane. (2016) "The development of interactive eNotes aimed at improving the learning experience in engineering higher education", BEng Thesis, Civil Engineering, (supervised by A. Giannopoulos)