

## Appendix to Report on IATL project 11-12/PI/Russ

### A personal introduction to linear algebra (July 2012 Steve Russ)

#### Feedback

There was a structured questionnaire given out on the final day of the project. The questions are reproduced here in the feedback from Student 1.

Student 2 did not use the template of questions, their response is given verbatim.

For subsequent responses (hand-written) we have summarised distinctive points made keeping a balance between positive and negative comments. The feedback extracts have not been edited – though they are selected extracts. In most cases the responses were anonymous and we have retained that here. One student did not send us the feedback (but we were very grateful for their input on the project!).

Student 1:

*1 What expectations did you have of what you would be doing on the project before it began?*

Before it began, I thought we would be sitting together discuss how to learn linear algebra. And our technical team should respond to first year students' opinions and made some tools and models to illustrate some difficult parts in linear algebra.

*2 We planned that Week 1 would focus on potential constructions in JS-EDEN to support the vectors/matrices material for learning linear algebra. We thought Week 2 would focus on making those constructions available to learners – that is, giving the key points, and the resources, for a learner to make their own versions of the constructions you made in Week 1. From your point of view, is that what happened? Or was it much the same throughout the two weeks?*

I think in week one we have already done some constructions in everybody's own version. Everyone knows something about ODA and JSeden, so it is a good and quite efficient start although the tool is not mature enough. However from my point of view, first year students cannot implement their ideas of constructions fully into the model they have built (except Joe), perhaps because the JSeden tool is not mature enough and they are not very familiar with it. The limit of the tool and lack of skills in JSeden constrain their thought. It would be much better if the tool is better, then every one's understanding and construction of learning will be more clear. But from another perspective, it is also a great experience to see their process of learning programming with JSeden, which itself is a process of understanding.

*3 How much do you feel we achieved over the two weeks of what we set out to achieve?*

I think we achieved what we set out to achieve in the general orientation in the first week. There are some small goals and plans, such as preparing lectures for linear

transformation, which is not that important and it is good that we can adjust our plans on the fly.

#### *4 What did you learn most about?*

First I learned something in linear algebra. Learning is a process of confusions. I thought I understand linear map, but while Stelios talked about linear map is a bridge between vectors and matrices. I feel confused again. Then I read my first year notes and then confusion is solved. Sometimes you first meet a theorem and you feel confused and after some thought you find that you understand it. However you may still feel confused when meeting this theorem again after a long time. I believe it is because you did not put it into the right place in your own system of knowledge, you should really associate it with your old knowledge and understand their relationships, which has almost the same spirit as programming in Empirical Modelling.

Second I learned something about JSeden. I understand some difference between tkeden and JSeden, and how to program in JSeden.

Third I learned something about learning itself. On the first day, you talked about learning which is enlightening. I could not rephrase what you have said on that day, but I think I understood. Could you please send your ppt to me please?

#### *5 How would you describe your experience of the project?*

I would describe it to be very benefiting and enlightening. It is good for people to communicate together, which is also a process of learning because we find the highlight of other people's word and then compare to ourselves' words.

#### *6 Any other comments*

One suggestion is we'd better let first year students to talk more.

Student 2:

“It was a great pleasure to be part of the team on this project. I have thoroughly enjoyed the past two weeks and the experience has had a strong influence on my philosophy of learning. Having quite strict views on things, this project has helped me to appreciate various aspects of learning that I feel have been neglected. Although the physical results that were hoped for were far from developed as much as any of us would have liked – the research and insight gained as a result of the investigation and discussion seemed much more rewarding than anything we might have built. I personally enjoyed the technical aspects of the modelling we did the most. I feel I've learnt a lot about specialised languages, interactions between platforms, geometric representation of mathematics and problems with collisions between perceptions. Overall I am incredibly thankful for the opportunity to work with colleagues and specialists within the department on this project, I would be the first person to sign up for something similar if the possibility arises again.”

Student 3:

“Very different approach to learning which focuses more on understanding the subject/topic rather than necessarily getting the right answer. .... Never worked in a research environment before, it was very fun and enjoyable. .... These type of researches need to be longer than 2 weeks. 2 weeks is simply not enough. ...

Student 4:

“I don’t think we achieved a lot of tangible results ... a lot of good models were made by everyone but we have not made them completely user friendly and available to people. .... I still don’t fully understand what EM is and what you are fully trying to achieve ... It was a good experience regarding how research projects work.... I think what our role / task was needed to be more clear, I had a good time though.”

Student 5:

“For week 2 I was expecting more experimenting with the application, rather than focusing on theoretical material .... It would be appropriate to have a feedback from pupils from schools.”

Student 6:

“I feel we have achieved quite a lot over the 2 weeks, because we had understood something about Empirical Modelling and the objective of the project ... the experience I had was quite good as I could experience how a research group does and what they would try to achieve. I was glad that I could be part of the project ... “

Student 7:

“I wasn’t completely sure of the aim of the project. ... We spent most of the time constructing the model rather [than] making it available to learner. I think this tool is quite complicated for the beginners to use ... I think we have achieved more than half of the set task ... if we had more training sessions and time we would have achieved more than this. .... I have learnt more about EM, and have also decided to take this module in the fourth year. I have deeper understanding of linear algebra now. ... Overall I had good time working on this project. First time working on a research project gave me the taste of work in real life. ... Improve on the planning next time.”

*Steve Russ  
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