

# Student to lecturer link

Andrea Asamoah, Christos Koumenides, Chrysovalanto Kousetti, David Handford  
School of Electronics and Computer Science  
University of Southampton, UK

{aa1304, clk1v07, ck1004, djh07r}@ecs.soton.ac.uk

## ABSTRACT

Interactivity and feedback are key contributors to providing an effective learning environment for students. Lectures provide the main resource for university students to discover what is expected of them and to identify the key learning goals related to a course, from a lecturer. This paper focuses on resolving the problems and anxieties faced by first year Computer Science students at the University of Southampton, through various user-centred design methodologies. Lecturers are also considered to look into providing a design idea or recommendation that will motivate students to be more forthcoming with their problems, as well as support the current practices of lecturers. To facilitate interaction with lecturers, it is important that students can acknowledge that the lecturer will deal with their problems and that the participation from the lecturer is not excessive. Results from the interviews, questionnaire and diary study highlighted anonymity and feedback as focal areas to consider in an online-based system. This would encourage students to voice their concerns about lectures or topics that they find difficult.

## General Terms

Design, Experimentation, Human Factors

## Keywords

Lecture, Quality Of Life, University, Communication

## 1. INTRODUCTION

New students at universities and especially first year undergraduates, can sometimes have difficulties in addressing their concerns, questions and ideas about their courses [12]. Faced with a transitional stage of adapting to a new lifestyle and school environment, many students tend not to take full advantage of course resources. Active participation in classrooms, immediate feedback to student questions and cognitive discussions on course material can add value to a classroom and facilitate student learning [4,7]. The quality of learning can be enhanced if universities nurture students to be actively involved in courses. Whether promoting in-class participation, face-to-face meetings with lecturers or using social and knowledge-based technology, the goal is essentially the same; to nurture a stimulus-learning environment for students.

Considering that different lecturing styles do not always match the individual students' learning habits, sometimes it depends on the ability of the student to identify and absorb the essential parts of a lecture. This ability is acquired through systematic practice and extensive use of educational technology. Guided team-work and the exchange of ideas between students should

be encouraged, as they are imperative in the making of excellent learners [8].

The hypothesis of this research states, "*Student feedback throughout a course can improve the quality of lectures*". The intention of this research project is to seek ways of facilitating better interaction and learning in lectures. Considering the wide availability of instructional and social technology at universities, it is vital to investigate which software students and lecturers find useful. For the investigations, we are focusing on first year Computer Science undergraduates at the University of Southampton, thus enabling us to probe a highly acclaimed university's attitude toward student in-class collaboration.

## 2. RELATED WORK

Significant research has been ongoing in the learning research field regarding the value of lectures and productivity of students. Interactivity is an important aspect of lectures that many papers address and consider to be essential in improving the quality of lectures. It is defined as being one of the weakest points of a lecture [4].

Interactivity is important for both students and lecturers as it is:

- The cause for stimulating for students to think and learn
- Used as a measurement for the amount of material understood by students

Self-study is a valid necessity for a student to be successful; however it may not be sufficient for all students. The importance of lectures is further highlighted by Fowler et al. who noted that "students who are skilled computer users (such as computer science majors) have a learning style that is both sensory and visual, and that 80% of all students are active learners" [5].

One technological solution given by many researchers is the use of interactive computer technology to engage students in the classroom. The lecturer can place questions on the projector accompanied by multiple choice answers. The students can then use handsets to select one of the available options. The studies examining these technologies [4,7] identify both advantages and disadvantages. Technology offers partial anonymity which 42% of the participants in study [7] embraced. Study [5] recognized that a significant 95% of the students participated in answering the questions. On the other hand, the referenced technology had several limitations such as numerous failures and delays, which directly impacted the amount of material that could be covered.

The above technology has also been tested with first year Computer Science students at the University of Southampton [3]. 75% of students from both Engineering and Computer Science disciplines found the technology to be useful. Other implementations have also considered asynchronous

approaches, such as online based teaching [1] or the use of course diaries through instant messaging [2], which have also demonstrated the importance of interactivity.

### 3. METHODOLOGY

A variety of methods were used to identify key features of an effective learning experience. The design methodologies used involved collecting information from first year lecturers and students. Interviews were chosen as one of the methodologies due to the broad spectrum of information they can ascertain. There were relatively few first year lecturers, so over half could be interviewed. In contrast, there are currently 95 first-year Computer Science students, so choosing an online questionnaire for students was more effective at eliciting information from a larger population. Further studies were performed using a smaller sample size of students, including interviews, a diary study and a lo-fidelity prototype. The interviews allowed richer information to be gathered and the diary study allowed structured and quantifiable information to be gathered about lectures from the students' point of view. The lo-fidelity prototype was used to evaluate a proposal for an online feedback-alert system with 4 student participants.

**Lecturer interviews:** A sample of 5 lecturers was taken which includes lecturers teaching in 8 out of the 11 modules in the first year. The lecturers were interviewed in order to:

- Determine the quantity and variety of communication between lecturers and students
- Identify preferred teaching styles
- Establish lecturer's views upon electronic learning

**Student questionnaire:** Responses for the questionnaire were accumulated from 21 first-year Computer Science students. The questionnaire included both objective and open-ended questions [6], which helped to identify possible trends and common practices among students. The sample population was asked to provide their opinions on educational resources. On a broad scale, the objectives of the questionnaire were focused on three main issues:

- Methods of solving academically related problems
- Use of current resources
- Anxieties and motivation

**Student interviews:** The answers given in the questionnaire helped to shape the questions asked in the interviews. The interviews were designed to establish:

- The quantity and variety of communication between lecturers and students
- Opinions on improving the learning experience
- Opinions of the learning process including labs and tutorials

Interviews were conducted with five students and lasted approximately thirty minutes each. The aim was to stimulate responses from the interviewees by keeping a conversational tone through a set of predefined questions. Interviewees were asked to expand on topics related to their transition to university, their interaction with lecturers, things they find stimulating about their experiences, as well as possible improvements they may consider necessary.

**Student diary study:** A diary study was conducted to further support findings regarding students' experiences of lectures. A total of 5 students participated in a diary study over a week and were asked to record their experiences in lectures, labs and tutorials. These included:

- Interactions with the lecturer, specifically the number of questions asked
- Opinions on the sessions, including ratings and open ended comments (similar to [9])

**Student prototype session:** For the prototype session, a few buttons and windows were created to give the participants existing components to work with. Unlike the usual approach of having a pre-defined design and getting participants to follow tasks and comment on the user interface, each student was given a blank canvas to "build their own interface". Students were allowed to create additional components for the interface, as well as eliminate or adapt any component that they felt was not necessary. This approach was useful for discovering students' preferences without the bias of an existing interface. Furthermore, it allowed for the discovery of aspects of the interface that would motivate a student to participate in such an environment.

### 4. RESULTS

The interviews conducted with the lecturers indicated that a number of the university applications are restrictive and not very easy to navigate. As a result, students are de-motivated to use the university online resources, such as the undergraduate wiki<sup>1</sup> and Blackboard<sup>2</sup>. According to a lecturer, "*teaching motivates lecturers, whereas with students it requires more effort to motivate them to use a learning/collaborative system*". It was reported that class sizes and the amount of material that needed to be covered could often make it difficult to arrange seminars/tutorials with the right degree of interactivity, especially when class sizes were reaching closer to 100 students.

Lecturers reported receiving questions from students related to coursework, organisational issues, clarification of lectures and potential examination questions. Questions were addressed on a face-to-face basis during or at the end of a lecture, or via email. Most lecturers indicated that they receive at most 1-2 emails per week, with the number increasing during coursework and examination periods. Lecturers preferred email due to their high workload and stated that they would probably be reluctant to use additional technology.

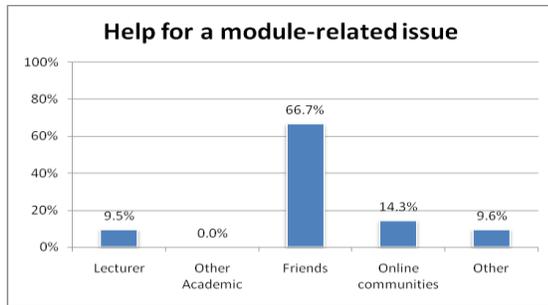
In general, most lecturers felt that students should be encouraged to help each other and should take a degree of responsibility for their learning. This was because they observed that students seem to learn better from their peers.

Results from the questionnaire indicated a high degree of compliance from students to use their friends, as a primary source of help for module-related issues. Only a few students reported willingness to pose a question to a lecturer. The results are depicted in Figure 1.

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<sup>1</sup> <https://secure.ecs.soton.ac.uk/cgi-bin/ug/wiki>, [accessed 08-05-17]

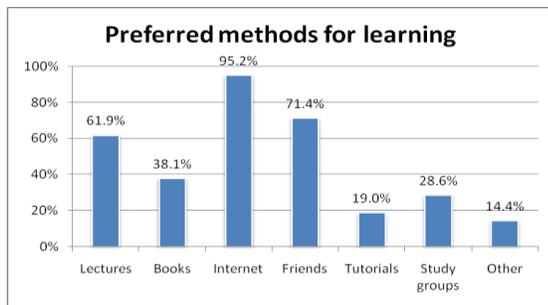
<sup>2</sup> <http://blackboard.soton.ac.uk/>, [accessed 08-05-17]



**Figure 1. Question: “Who do you mostly seek help for a module-related issue?”**

On several occasions students claimed that groups provide a more efficient way of understanding material from lectures. Students identified that collaboration implies more ideas and better solutions. Other students claimed that studying on an individual basis allows for better concentration but nonetheless would not hesitate to reach for a friend’s advice when in need.

One of the questions asked students to express their preferences on learning material by choosing their favourite resources among a list of subjects. The Internet was reported as the preferred method, but attending lectures and asking friends were also rated very highly. The results appear in Figure 2.



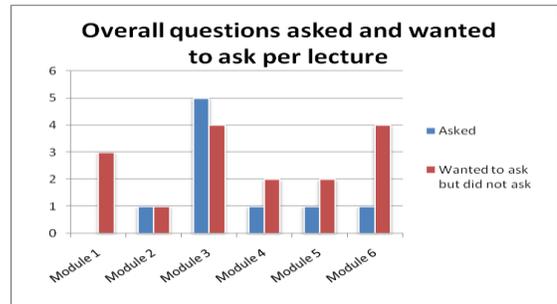
**Figure 2. Question: “Which resources do you find best for learning and understanding course material?”**

On an individual basis, three students expressed discontent for their lecturers’ teaching styles and repeatedly requested more examples to be included in the lectures. Four students described their worries about having to communicate with other people, with some of the reasons being shyness and language barriers. On a few occasions, students showed concerns about the prior knowledge on course material that is implied or assumed by many modules, especially the programming ones. One of the students suggested a system that should facilitate a prompt and straightforward way of asking questions and receiving immediate feedback.

The results from the interviews helped to reinforce some of the outcomes of the questionnaire and clarified some of the points and comments previously made by the same students. Most of the interviewees described the transitional stage as “intense” or “extremely difficult”, primarily because of the freedom they are given to self-organize and adjust to the new lifestyle. “Enthusiastic lecturers” were reported to actively engage students in the classroom, even in cases where topics were described as “intense”. The students also raised ideas about online collaboration and signified the importance of *anonymity*, allowing them to address their questions without worrying about

the impressions they make on their peers. Similar observations are reported in [4,7,11,12].

The results from the diary study showed that students only voiced 36% of the questions they had in lectures. Figure 3 shows a comparison of questions asked and questions students wanted to ask. It can be observed that for 5 out of 6 lectures there were more unanswered questions than answered ones.



**Figure 3. Comparison of questions asked and questions students wanted to ask during the lectures.**

The prototype session produced four possible design considerations (Figure 4), as well as recommendations for an online-based system, given by the students. These include:

- Anonymous posting
- Links to existing university resources such as the undergraduate wiki
- The necessity of the system being used by other students and the lecturer addressing their concerns
- Feeds of the latest updates
- Customization of the interface
- Provision for an area to discuss exam topics



Prototype 1



Prototype 2



Prototype 3



Prototype 4

**Figure 4. Final Prototypes.**

## 5. DISCUSSION

The hypothesis is supported by the research results and recommendations can be made for a possible system.

The results show that anonymity is important to most students when asking questions, but not for all. This observation is also supported by related work [4,7]. Any system developed to assist lectures should allow students to submit anonymous questions. Students would require such a system to regularly send feedback to lecturers in order to address their concerns in upcoming lectures. In addition, the system would need to communicate to the student that the lecturer has addressed their concern. These alerts would give students the confidence that their comments matter and that they have actually been addressed, which differs to existing resources such as wikis and forums.

Furthermore, the results have shown that in order to encourage students to use a new system, it should include or at the very least be linked to existing university resources. This would allow students and lecturers to apply the skills they have from other applications and help to reduce the learning curve posed in adapting to a new system. The additional option of personalising the user interface would be important in supporting a student's individual preferences. In implementing an online-based system, this avoids any disruption of lectures as those caused in conventional voting systems.

## 6. FUTURE WORK

The investigations have largely focused on conducting field research, to identify possibilities for improving the quality of learning. A priority for future research would be to ensure a wider coverage of first-year undergraduates, to attest that the quality and accuracy of our results are indeed representative of the entire target population. The highest number of responses received by our methodologies was 21, which would need to be increased by a significant amount considering lower levels of acceptable error [10].

As already mentioned, our observations indicate that students are willing to experiment with new technologies. Students' reliance on Internet technologies to target module-related problems, infers that a facility for better collaboration with their peers should be embraced. Future research could be directed towards delivering an accessible system that could be integrated with the current ECS intranet.

## 7. CONCLUSION

This research project has focused on the study of communication between students and lecturers, as a way of improving the quality of learning and consequently the quality of life for students. The outcomes of the research activities have been highly supportive of the original hypothesis. Students have been observed to value their friends' opinions, resolve problems by attending lectures and forming study groups, and use the Internet as their primary resource. To this end, the design proposal of an online-based system aims to improve and better facilitate in-class interaction, student motivation and learning stimulation. Implementing such a system requires the adaption of the department's policy regarding facilities for supporting

students. The final conclusion that can be drawn from this project is that lectures will always have their place in university learning but adapting them to the real needs of the students could make them more useful and productive. Student feedback is a valuable resource for making this adaption as it allows lecturers to design lectures according to the students' level of understanding.

## 8. ACKNOWLEDGMENTS

Thanks go to our supervisors, Dr Mc Schraefel and Dr Kirk Martinez, and all the participants that took part in the research.

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