

## **DO YOUR STUDENTS KNOW THE LEARNING OUTCOMES OF YOUR PROGRAMME?**

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### **ABSTRACT**

A study was carried out amongst undergraduate students taking the Process & Chemical Engineering degree at University College Cork to investigate their knowledge of the learning outcomes concept and the application of learning outcomes within their degree programme. This study was conducted by surveying the students using a short questionnaire. Analysis of their responses showed that the concept of learning outcomes is not clear to most of them and there is a need to educate the students about the learning outcomes concept and to define in detail and communicate the learning outcomes of the degree programme.

### **INTRODUCTION**

Learning outcomes are action statements describing what a student is capable of demonstrating in terms of knowledge, understanding, skills and attitudes after completion of a learning activity. International trends in education show a shift from the “teacher-centred” approach to a “student-centred” approach [1]. This alternative model focuses on what the students are expected to be able to do at the end of a module or programme. Hence, this approach is referred to as an outcomes-based approach, where learning outcomes are used to express what students are capable of doing at the end of the learning period. In the EU with the implementation of the Bologna Process by 2010, all modules and programmes throughout the participating countries will be expressed using learning outcomes. Furthermore, accreditation bodies, such as Engineers Ireland (EI) and the Institution of Chemical Engineers UK (IChemE) use this learning outcomes approach in accrediting degree programmes [2, 3].

In early 2007, a “knowledge of learning outcomes questionnaire” was given to years 1, 2, 3 and 4 in the undergraduate degree programme in Process & Chemical Engineering at University College Cork (UCC). The questionnaire is presented below. The purpose of this questionnaire was to assess the current knowledge of Learning Outcomes amongst the students. The purpose of this paper is to present a summary and analysis of the data for each of the questions in the questionnaire and to present some conclusions.

## KNOWLEDGE OF LEARNING OUTCOMES QUESTIONNAIRE

The purpose of this questionnaire is to assess the current knowledge of **Learning Outcomes** amongst students in the Department of Process & Chemical Engineering. I would be grateful if you could fill in this questionnaire. Do not write your name anywhere as responses are anonymous. Your input is a valuable contribution to our work on learning outcomes. Many thanks.

1. In what year are you registered?    1<sup>st</sup>                       2<sup>nd</sup>                       3<sup>rd</sup>                       4<sup>th</sup>

2. How would you rate your level of confidence in being able to explain the concept of a learning outcome to another person?

                                                                                         
Very confident    Fairly confident    Not sure    Poor confidence    Very poor confidence

Please comment \_\_\_\_\_  
\_\_\_\_\_

3. How would you rate your level of confidence in being able to write down the Learning Outcomes of your degree programme?

                                                                                         
Very confident                      Fairly confident    Not sure    Poor confidence    Very poor confidence

Please comment \_\_\_\_\_  
\_\_\_\_\_

4. Has anyone in the Department explained to you what are the learning outcomes of the degree programme in Process & Chemical Engineering?

Yes                       No

If Yes, please explain briefly \_\_\_\_\_  
\_\_\_\_\_

5. For modules given within the Department, approximately what proportion of lecturers presented the learning outcomes for their modules?

Nobody did                      Some did                      About half did                      Most did                      All did  
                                                                                       

6. For modules given outside the Department, approximately what proportion of lecturers presented the learning outcomes for their modules?

Nobody did                      Some did                      About half did                      Most did                      All did  
                                                                                       

Thank you for completing this questionnaire. Your help is very much appreciated.

## SUMMARY AND ANALYSIS OF DATA

A summary and analysis of questions 2 to 6 in the questionnaire is provided below:

### Q2 How would you rate your level of confidence in being able to explain the concept of a learning outcome to another person?

A summary of student responses to this question is presented in Figure 1. From this:

- Less than 5% of students stated that they were “very confident”.
- Nearly 50% stated that they were “fairly confident”, however nearly 50% stated that they were either unsure or not confident.

Furthermore, from the comments made by students, it became clear that those who stated they were “fairly confident” do not really have a good understanding of what a learning outcome is. For these students, learning outcomes are things that you know or understand from completing a course. Overall, it can be concluded from the data that there is a real need to educate students about the learning outcomes concept.

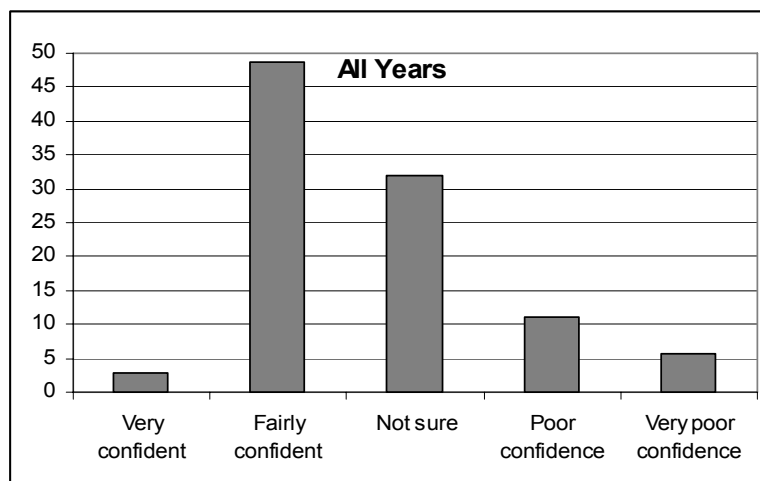


Figure 1: Summary of student responses to question 2

### Q3. How would you rate your level of confidence in being able to write down the Learning Outcomes of your degree programme?

A summary of student responses to this question is presented in Figure 2. From this:

- Less than 2% of students stated that they were “very confident”.
- Around 42% stated that they were “fairly confident”, however over 50% stated that they were either unsure or not confident.

Furthermore, from the comments made by students, it became clear that those who stated they were “fairly confident” are using their own perception to try and state what they would know or understand from completing a course. Overall, it was concluded from the data that there is a need to spell out in detail to the students what the learning outcomes of the degree programme are.

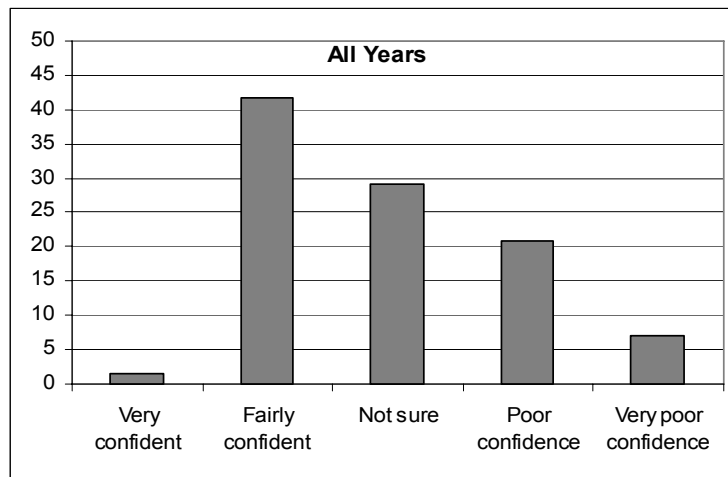


Figure 2: Summary of student responses to question 3

**4. Has anyone in the Department explained to you what are the learning outcomes of the degree programme in Process & Chemical Engineering?**

A summary of student responses to this question is presented in Figure 3. From this:

- Over 60% of the students stated “No”, that is, the learning outcomes for the degree programme were not explained to them.
- The percentage number of “No”s is greater amongst the third and fourth years than the first and second years, however all years had a greater percentage of “No”s.

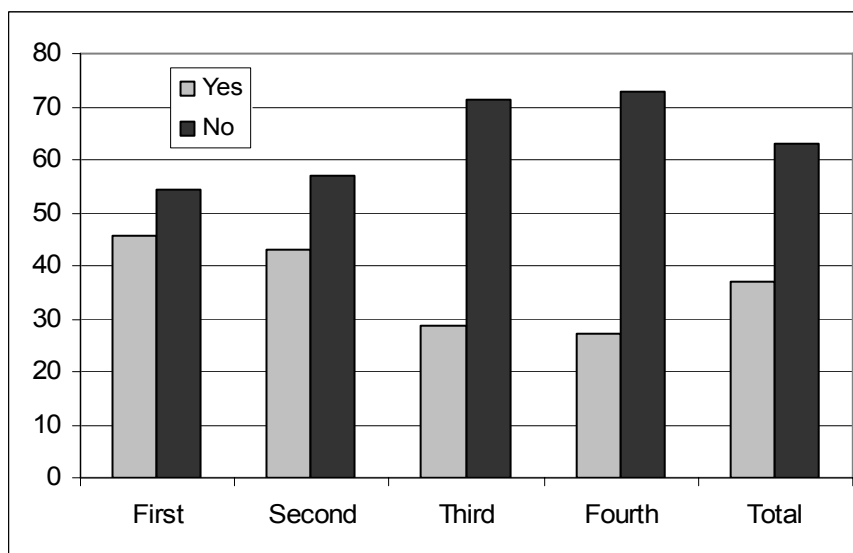


Figure 3: Summary of student responses to question 4

From viewing the student comments, it became clear that many of the students who stated “Yes” obtained their knowledge from one particular module (PE1003 Introduction to

Process Engineering) taught by a member of staff to first year students. The programme learning outcomes do exist in the Department accreditation documents submitted to IChemE and EI, but it appears that these are not communicated to the students.

**5. For modules given within the Department, approximately what proportion of lecturers presented the learning outcomes for their modules?**

A summary of student responses to this question is presented in Figure 4. From this, it can be concluded that roughly about half of the lecturers in the Department of Process & Chemical Engineering presented the learning outcomes for their modules, as perceived by the students.

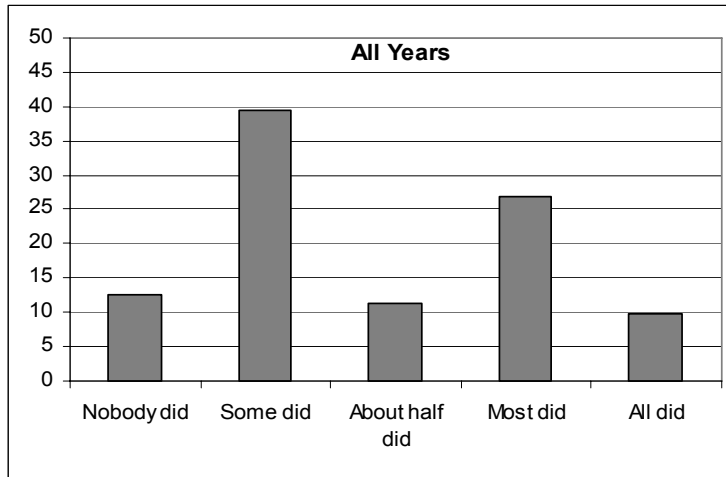


Figure 4: Summary of student responses to question 5

**6. For modules given outside the Department, approximately what proportion of lecturers presented the learning outcomes for their modules?**

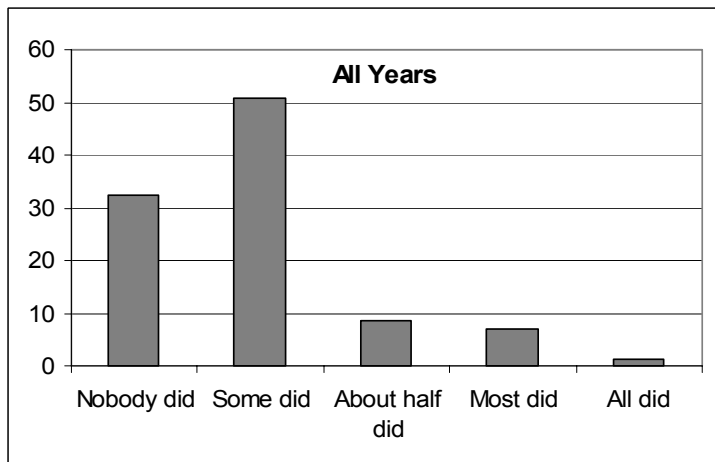


Figure 5: Summary of student responses to question 6

A summary of student responses to this question is presented in Figure 5. From this, it can be concluded that the majority of the lecturers in other Departments did not present the learning outcomes for their modules, as perceived by the students.

## CONCLUSIONS

- The concept of learning outcomes is not clear to most undergraduate students taking the degree programme in Process & Chemical Engineering at UCC.
- There is a need to educate the students about the learning outcomes concept, considering its recent adoption in UCC and the importance of learning outcomes within teaching & learning in general.
- The learning outcomes of the degree programme in Process & Chemical Engineering are not clear to most students.
- Eventhough programme learning outcomes exist in accreditation documentation; there is a need formulate them in a “student friendly” format and to communicate them to students. Furthermore, there is a need to explain how module outcomes are striving to help them attain the programme outcomes.
- Only about half the lecturers in the Department of Process & Chemical Engineering are perceived by the students to be explaining learning outcomes for their modules.
- It is perceived by the students that the majority of lecturers from other Departments did not explain the learning outcomes of their modules to the students.

Even though this was a small study, it is possibly true to state that some of the conclusions may be relevant to other engineering degree programmes in Ireland. In particular, the need to communicate programme learning outcomes to students and how the achievement of module learning outcomes is resulting in the achievement of programme learning outcomes.

## REFERENCES

1. Kennedy, D., Writing and using learning outcomes: A practical guide, University College Cork, 2007
2. The Institution of Engineers of Ireland, Accreditation criteria for engineering education programmes, 2003
3. The Institution of Chemical Engineers UK, Accreditation Guide: Undergraduate study, 2005