

# **Students Contributing Towards the Development of Realistic Learning Outcomes in their Applied Physics Course at the University of Zimbabwe**

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# ABSTRACT



- Paper based on study involving a detailed description of a typical example of good practice in teaching & learning at higher education level.
- 18 H. Economics serving trs. (B.Ed. students in the Dept. of Tech. Ed. at UZ) from all over Zimbabwe participated.
- Applied Physics:- One of the pre-requisite courses designed to equip students with relevant knowledge and skills to manage further courses in the programme.
- PRE-TEST: Students indicating pre-course expectations.
- POST-TEST: Students indicating extent to which course measured up to expectations in terms of needs, regarding professional development.

# Introduction and Background to the Problem



Since 1989, this researcher has taught several courses at Bachelor of Education (B.Ed.) and Master of Education (M.Ed.) degree levels in the Department of Technical Education at the University of Zimbabwe; among which, Principles of Design; Applied Physics; Material Science, and Research Methods have been the most outstanding.

# Introduction and Background to the Problem (Continued)



After graduating from colleges around the country, various groups of serving teachers come for specific degree programmes in their respective areas of specialisation. Over the years, it has been personal practice, to present students with the relevant course outlines soon after registration. In each case, students scrutinize the document before giving a detailed account of their pre-course expectations, guided by the following: ‘Describe and explain what you expect to gain from this course, in terms of knowledge, skills and abilities, for your professional development’.

# Introduction and Background to the Problem (Continued)



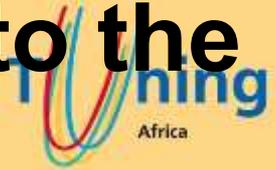
Initial (pre-course/pre-test) accounts are later linked to post-course accounts, where students address the following task: 'Describe and explain the extent to which you found the course measuring up to your expectations in terms of needs, regarding professional development'.

# Introduction and Background to the Problem (Continued)



It is within this context that this study was designed to determine the views of H.E. students, regarding their expectations and achievements from the said pre-requisite Applied Physics. This course has been very important for H. Economists since advent of D&T in the teaching/learning of technical subjects in 1987 .

# Introduction and Background to the Problem (Continued)



Together with several other subject areas, among which Applied Chemistry has been the most prominent, Applied Physics has been one of those designed to make teaching/learning of H.E. more & more scientific; resulting in the subject being more & more appropriate in terms of problem-solving, especially now, at a time when teaching/learning of technical subjects is no longer business as usual.

# Introduction and Background to the Problem (Continued)



Since 1987, there has been a move from traditional to the more innovative/progressive problem-based D&T approach. For trs., there has been a need to continue learning through life-long programs, such as the said B.Ed. program at UZ . It is indeed this sense of need that was assumed and believed to have motivated teachers in this study to join the said program with specific expectations, regarding their professional development.

# Introduction and Background to the Problem (Continued)



Therefore, one needed to get informed about those expectations in order to assist by facilitating their learning accordingly, from an informed position. This is why it was necessary to determine their anticipated expectations and exit views (regarding achievement) through pre- and post-course investigations respectively.

# The Theoretical Framework and Related Perspectives



Theoretically, the following issues were of particular interest:

2.1 The relationship between teaching and learning;

2.2 Principles of course design, and

2.3 Concept of '*teacher researcher*'.

# The Theoretical Framework and Related Perspectives (Cont.)



2.1 The relationship between teaching and learning:

With this study, based on a story of good practice in teaching and learning in higher education, it was necessary to relate teaching and learning within the context of higher education.

# The Theoretical Framework and Related Perspectives (Cont.)



## 2.2 Principles of course design:

With the said Applied Physics course-outline central to investigations, there was no way one could avoid dealing with issues relating to principles of course design. Course-outlines/syllabi for any area of study are usually accompanied by instructional materials; normally underpinned by specific principles in terms of design.

# The Theoretical Framework and Related Perspectives (Cont.)



2.3 The concept of teacher research/er:

Sharing practical experiences, regarding 'good practices in teaching/learning', there was no way one could avoid the research component. Modern trend has meant the two becoming more & more inseparable. With successful teaching practice guided by research, there was need to clarify on the concept of teacher-research/er.

# **Main research question**

To what extent could students' expectations contribute towards the development of realistic learning outcomes for a pre-requisite Applied Physics course in the Department of Technical Education at the University of Zimbabwe?

# Sub-questions



(a) What understandings do students have of the whole course outline and its intended learning outcomes?; (b) To what extent are the existing intended learning outcomes in alignment with student expectations in terms of professional development?; (c) What adjustments could be necessary within the course outline, in view of students' expectations?, and (d) How do anticipated gains compare with actual achievement at the end of course?

# Methodology



Given investigations where results were expected to inform practice with a view to enrich the process of teaching/learning, focusing on Applied Physics, the most suitable approach was '*Developmental Action Research*'. This explains the cyclic nature of activities suggested by the pre- and post-course accounts obtained from the 18 students involved. All accounts were analysed through document analysis.

# Key Results & Findings



## **5.1 General understanding of course-outline and intended learning outcomes:**

After studying the course outline, students gained a reasonable understanding of the course outline and its existing intended learning outcomes.

# Key Results & Findings



(Cont.)

## 5.2 Intended learning outcomes versus student expectations:

Realized their weak background regarding Science in general and Applied Physics in particular, students then expected to have recovered from this weakness by end of the course; thereby appealing for an appropriate approach in terms of teaching/learning.

# Key Results & Findings

(Cont.)



## 5.3 Necessary adjustments in the course-outline:

While no additional ILOs were introduced, there was need to focus on an approach that allowed students to actively participate in the teaching/learning process; thereby, striking a balance between theory and practice through hands-on activities.

# Key Results & Findings



(Cont.)

## **5.4 Anticipated gains versus actual achievement, regarding professional development:**

Generally, all students found the course measuring up to their expectations in various ways. Although the descriptions and explanations differed from account to account, they pointed to the same direction; saying it all!

# Discussion of Conclusions and their implications



1. It is important for learners to have a clear understanding of a given course outline and its ILOs, if they are to contribute meaningful to the teaching and learning process as equal partners in the enterprise.

# Discussion of Conclusions and their implications



(continued)

2. The more actively involved learners become in the teaching and learning process, the more realistic and meaningful the ILOs in the course outline of the given course become, resulting in the learners being intrinsically motivated in their professional development.

# Discussion of Conclusions and their implications (continued)



3. Course design and development is a cyclic developmental process; hence the close link between Teacher Research and Developmental Research. This is explained by Ally's 1997 model, comprising seven developmental stages, where the learner is the chief stakeholder/player. These conclusions imply a lot in teaching and learning. As already indicated, both pre- and post-course accounts were important sources of data, found extremely useful for the purpose of course development/improvement.



**THANK YOU ALL FOR LISTENING!**