

First year university physics students' perceptions of the teaching-learning environment: In search of a coherent pedagogic learning orientation

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Abstract. Classroom inquiry and reflective activities are central to the improvement of the effectiveness of teaching practices. To this end, the investigation of aspects of teaching and learning in various educational settings is of paramount significance in order to provide insightful elucidation into the nature of teaching-learning environments. As part of this inquiry, the Experiences of Teaching and Learning Questionnaire was administered to first year university physics students at the University of Johannesburg in a bid to unearth their perceptions of the teaching-learning environment using the Teaching and Learning Research Programme's framework for analysis as the underlying conceptual framework. The Experiences of Teaching and Learning Questionnaire has been produced under the auspices of the Enhancing Teaching-Learning Environments in Undergraduate Courses Project in the United Kingdom. Critical interrogation of responses provided valuable insights into students' perceived nature of the teaching-learning environment forming an integral part of their academic training. In particular, students' pedagogic learning orientation appeared to hinge on the approaches they use as well as the extent to which they are well-organised in their study methods, use their time efficiently, and put concentrated effort into their work.

1. Introduction

A critical reflection on ways to enhance the teaching-learning environments is a crucial imperative for higher education institutions in their quest for human capital development. This imperative has direct bearing on students' existing knowledge and characteristics, students' approaches to learning and studying, students' perceptions of the teaching-learning environments as well as the quality of learning achieved. Students' approaches to learning and studying are premised on five distinct aspects in the form of deep approach, surface approach, monitoring studying, organised studying and effort management [1].

In terms of theoretical clarity, a deep approach indicates the intention to understand for oneself, backed up by processes of learning that involve relating ideas and use of evidence while surface approach indicates the intention to cope minimally with course requirements relying mainly on routine memorisation and procedural working [1]. Monitoring studying refers to the ability to stand back from one's learning and studying and reflect on how it affects academic progress [1]. Organised studying indicates how well students systematise their work on required tasks and manage their time effectively with effort management referring to the extent to which effort is well directed and concentration is maintained [1]. Key aspects which serve to characterise students' perceptions of the teaching-learning environments include aims, organisation and alignment; encouraging learning; assessment, assignments and feedback; supportive climate as well as evoking and showing evidence [1].

As part of this inquiry, the Experiences of Teaching and Learning Questionnaire (ETLQ) was administered to first year university physics students in a bid to unearth their perceptions of the teaching-learning environment using the Teaching and Learning Research Programme’s framework for analysis as the underlying conceptual framework. The Experiences of Teaching and Learning Questionnaire has been produced under the auspices of the Enhancing Teaching-Learning Environments in Undergraduate Courses Project in the United Kingdom [2].

2. Teaching-learning environments

The manner in which teaching-learning environments are structured should ideally provide meaningful opportunities for the maximisation of students’ academic experience. The influence of factors such as the nature of teaching, assessment and powerful learning environments [3] has widely been explored in various studies. It has been established that constructivist theories of learning provide a rich array of experiences which could arguably facilitate the development of students’ conceptual understanding [4]. Emphasis has also been placed on the provision of authentic learning tasks which mirror experiences in the real world [5].

At another pragmatic level, there has been discourse about the nature of teaching-learning environments which encourage and support high-quality learning [6]. In this regard, it has been established that differing approaches to teaching affect approaches to studying [7] and good teaching encourages engagement and reflection through which conceptual understanding develops [8]. Research efforts in this regard have been augmented by the development of various conceptual frameworks [9]. In essence, these conceptual frameworks primarily served to indicate how students’ pre-existing abilities and skills, in interaction with the teaching and departmental context they experience, influence their ways of learning and studying as well as the quality of their learning outcomes. In addition, the ways in which particular groups of academics organise their professional lives are intimately related to the intellectual tasks on which they are engaged [10] and teaching practices are mediated by the educational ideologies and the conceptions of teaching held by individual academics [11].

3. Conceptual framework

This inquiry is underpinned by the Teaching and Learning Research Programme’s framework for analysis [12] shown in Figure 1 below as the underlying conceptual framework. This framework serves as a conceptual lens through which the interconnectedness of the factors characterising the nature of teaching-learning environments is explicated.

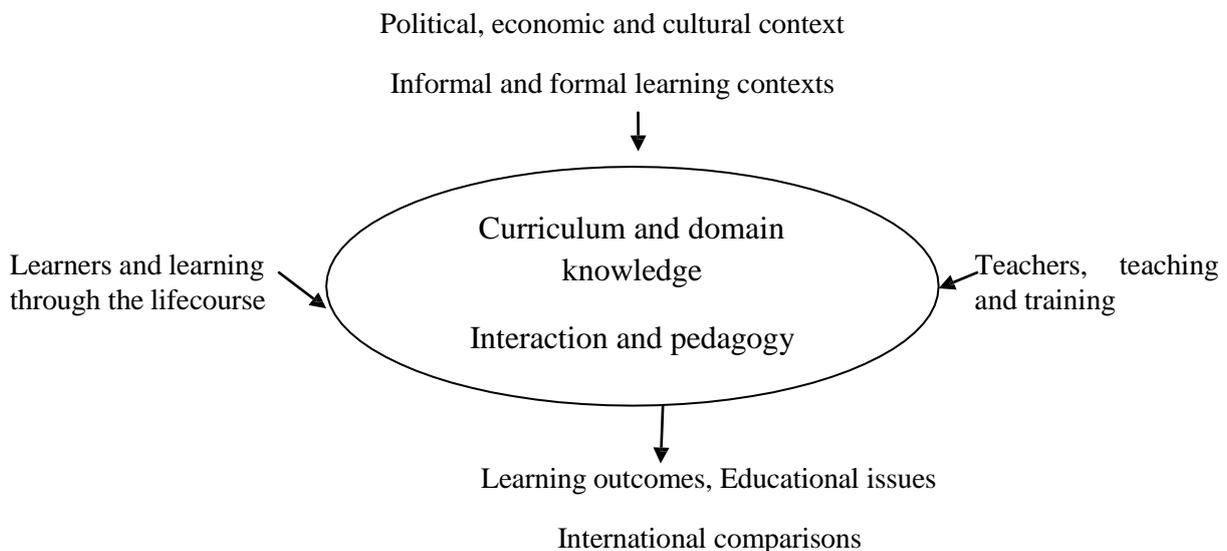


Figure 1: Teaching and Learning Research Programme’s framework for analysis

4. Research design and methodology

This inquiry seeks to establish first year university physics students’ perceptions of the teaching-learning environment as its primary objective. This was accomplished by administering the Experiences of Teaching and Learning Questionnaire (ETLQ) to first year mainstream Electrical Engineering (National Diploma Programme) students at the University of Johannesburg ($N = 114$) as part of a survey. For most of the items in the questionnaire, students responded on a 1-5 (5 = high) Likert Scale. Subscales were formed by adding together the responses on the items in that subscale. Each item was set as a variable and then a subscale total was produced by creating a new variable by summing the items. The average score was subsequently calculated for each category. The nature of the data obtained necessitated analysis by means of statistical tools. This inquiry is underpinned by the Teaching and Learning Research Programme’s framework for analysis as the underlying conceptual framework with a view to ensure appropriate epistemological coherence and premised on the following research question:

What are first year university physics students’ perceptions of the teaching-learning environment?

5. Findings

Table 1 below provides average values reflecting students’ perceptions in terms of the various constructs which underpin learning and studying.

Table 1: Average values reflecting students’ perceptions in terms of the various constructs which underpin learning and studying

Constructs	Key underlying aspects	Score
Deep approach	Intention to understand for oneself	6.7
	Relating ideas (including constructivist learning)	7.6
	Use of evidence	7.4
Surface approach	Memorising without understanding	3.0
	Unreflective studying	2.5
	Fragmented knowledge	3.1
	Unthinking acceptance	3.0
Monitoring studying	Monitoring understanding	7.5
	Monitoring generic skills	6.5
Organised studying	Organised studying	3.4
and effort management	Time management	3.2
	Effort	4.1
	Concentration	3.3

In terms of the scores, students appeared to experience difficulties with organised studying, time management, effort as well as concentration which are vital ingredients for academic success. Table 2 below depicts average values in terms of students' perceptions of the teaching-learning environment. While students' perceptions of the teaching-learning environment appeared to be largely positive in terms of the constructs specified, it was felt that the teaching-learning environment provided limited opportunities for autonomy (choice) and indulgence in broad general discussions (doubtful generality). In addition, the students were particularly pleased with aspects such as encouragement of high-quality learning, clarity and feedback about assessment, assessment for understanding, staff enthusiasm and support, as well as interest, enjoyment and relevance associated with the teaching-learning environment.

Table 2: Average values in terms of students' perceptions of the teaching-learning environment

Construct	Score
Organisation, structure and content	10.3
Alignment	10.9
Integration of teaching and learning materials	10.4
Choice	6.1
Encouraging high-quality learning	16.5
Clarity and feedback about assessment	18.3
Assessment for understanding	14.6
Staff enthusiasm and support	12.8
Support from other students	10.1
Interest, enjoyment and relevance	17.2
Doubtful generality or not easy to place	8.8

As reflected in Table 3 below, students' perceptions of the teaching-learning environment in terms of the cognitive demands made by the learning unit appeared to paint an optimistic picture as it was felt that meaningful opportunities for the acquisition of knowledge and subject-based skills were provided.

Table 3: Average values in terms of the demands made by the learning unit

Construct	Score
Acquiring knowledge and subject-based skills	17.2
Organising and communicating	18.5

While students' perceptions of the teaching-learning environment appeared to express a sense of appreciation for the opportunities provided for the acquisition of skills, more still needs to be done in this regard (Table 4).

Table 4: Average values in terms of the learning achieved

Construct	Score
Acquiring knowledge and subject-based skills	9.8
Organising and communicating	17.3

6. Discussion

First year at university can have many overly complex ramifications as it may in some instances turn out to be a daunting experience for students. It has been established that first year is in several respects a more challenging year for students [13]. Within the context of this inquiry, the key difference in the way students learn and study appeared to hinge on the approaches they use. The other key difference manifested itself in terms of the extent to which students are well-organised in their study methods, use their time efficiently, and put concentrated effort into their work. Students' perceptions of the teaching-learning environment in this inquiry have been considered in terms of various constructs which are dependent on curriculum dynamics. Awareness of disciplinary norm versus the diversity of student intake and the need to bridge the theory-real world divided are strongly advocated [13]. In terms of the conceptual framework outlined for this inquiry, the impact of contextual factors associated with curriculum change such as departmental context, institutional culture and history and policy environment characterising the teaching-learning environment ought to be quantified given the fact that the academic personnel may be operating under conditions of considerable pressure and increasing workloads [13]. The teaching-learning environment in this regard is essentially viewed as occurring within a formal and cultural learning context. The dynamics associated with the teaching-learning environment under consideration are encapsulated in the adapted conceptual framework as illustrated in Figure 2 below.

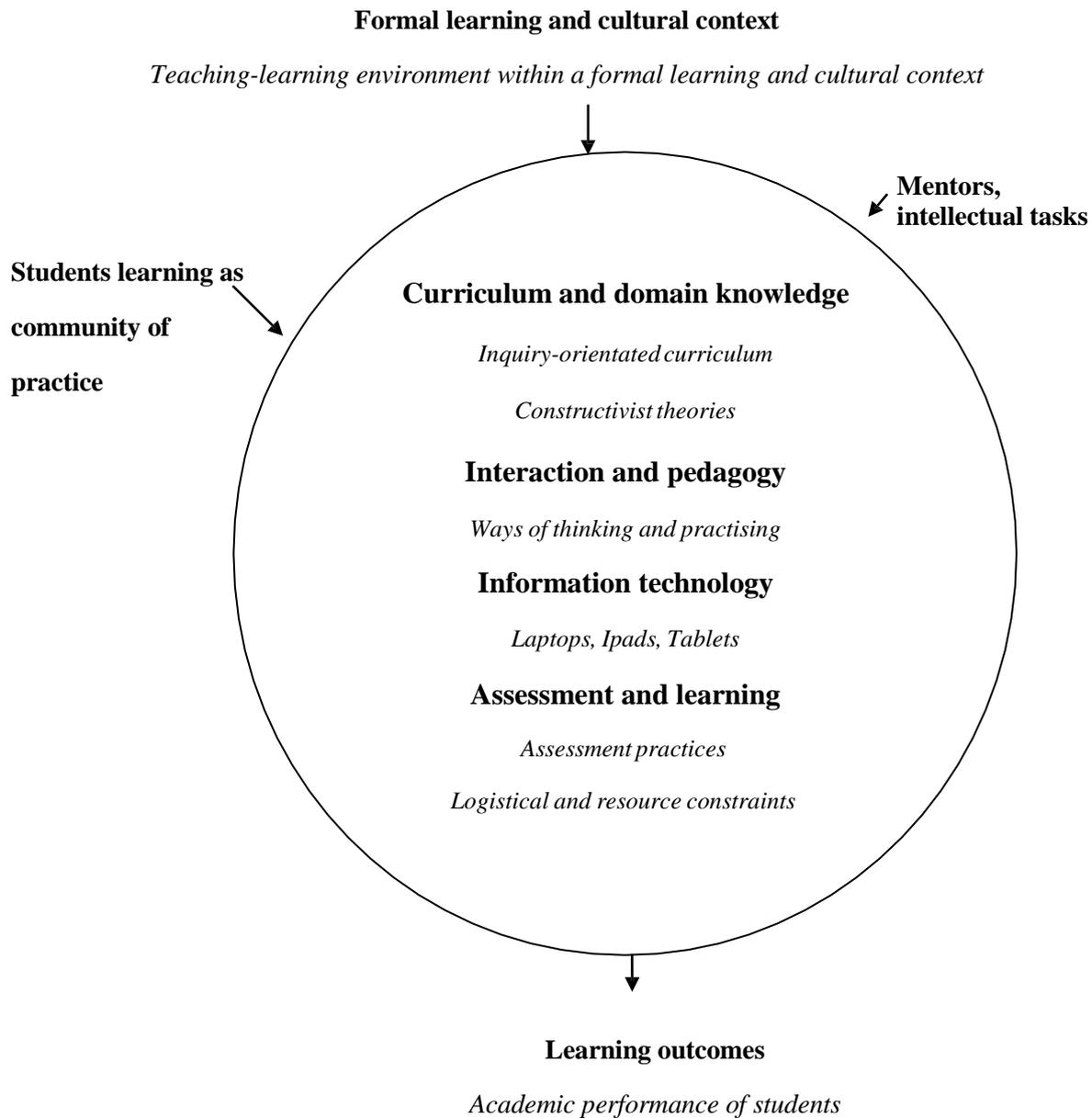


Figure 2: Adapted conceptual framework reflecting dynamics associated with the teaching-learning environment

7. Conclusion

There is an insatiable need to explore the nature of teaching-learning environments in more creative and meaningful ways in order to engender rational discourse about the interwoven factors afflicting the teaching-learning process. Students' perceptions of teaching-learning environments would hopefully serve to harness and enrich the relevant rational discourse in view of the fact that students' pedagogic learning orientation appeared to hinge on the approaches they use within the context of this inquiry. Within the context of this inquiry, students' pedagogic learning orientation appeared to hinge on the approaches they use as well as the extent to which they are well-organised in their study methods, use their time efficiently, and put concentrated effort into their work.

References

- [1] Entwistle, N., McCune, V., & Hounsell, J. (2003). Investigating ways of enhancing university teaching-learning environments: Measuring students' approaches to studying and perceptions of teaching. In E de Corte, L. Verschaffel, N. Entwistle, & J. Van Merriënboer, (Eds.). *Unravelling Basic Components and Dimensions of Powerful Learning Environments*: Oxford: Elsevier Science.
- [2] Experiences of Teaching and Learning (ETL) Project. (2001-2004). Higher and Community Education, The School of education, University of Edinburgh, Paterson's Land, Holyrood Road, Edinburgh EH 8 8AQ.
- [3] De Corte, E. (1995). Fostering cognitive growth: A perspective from research on mathematics. *Educational Psychologist*, **30**, 37-46.
- [4] Phillips, J.A. (1995). *The Theory of Multiple Intelligences: A Framework for Assessing the Competencies and Potentials of Malaysian Students*. Abstracts of the Second Asia-Pacific Conference in Educational Assessment and Research. Chiang Mai, Thailand.
- [5] Schank, R. C. (1999). *Dynamic Memory Revisited* (2nd ed.). Cambridge: Cambridge University Press.
- [6] Ramsden, P. (1981). *A Study of the Relationship between Student Learning and its Academic Context*. Unpublished PhD thesis, University of Lancaster.
- [7] Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and student learning. *Higher Education*, **37**, 57-70.
- [8] Anderson, C.D.B. (1997). Enabling and shaping understanding through tutorials. In F. Marton, D.J. Hounsell, & N.J. Entwistle (Eds.), *The Experience of Learning* (2nd ed.) (pp. 72-88). Edinburgh: Scottish Academic Press.
- [9] Entwistle, N.J. (1987). A model of the teaching-learning process. In Richardson, J.T.E., Eysenck, M.W., and Warren Piper, D. (eds.), *Student Learning: Research In Education and Cognitive Psychology*. London: S.R.H.E. / Open University Press, pp. 13-28.
- [10] Buchner, T. (2009). Deinstitutionalisation and community living for people with intellectual disabilities in Austria: History, policy, implementation and research. *Tizard Learning Review*, **14**(1), 4 -13.
- [11] Trowler, P. (1998). *Academics Responding to Change: New Higher Education Frameworks and Academic Cultures*. Buckingham: Open University Press
- [12] Teaching and Learning Research Programme (T.L.R.P). (2006). *Improving Teaching and Learning in Schools – A Commentary by the Teaching and Learning Research Programme*. Institute of Education. University of London.
- [13] Teaching and Learning Research Programme (T.L.R.P). (2006). Enhancing learning and teaching in Economics: A digest of research findings and their implications. *Enhancing Teaching-Learning Environments in Undergraduate Courses Project*, Higher and Community Education, School of Education, University of Edinburgh, Edinburgh.