THE USE OF REFLECTIVE PRACTICE TO PROMOTE PHARMACY STUDENTS' METACOGNITION IN A FOUNDATION ANATOMY COURSE

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ABSTRACT

Students' ability to characterise their learning approaches has the potential to enhance their overall educational experience and guide educators to tailor their pedagogical approaches. The aim here, through students' reflective practice, is to promote their metacognition. Also, to gain insights to pharmacy students' initial approaches to studying anatomy and their perceived value of anatomy as a subject. The study also aimed to contextually capture students' perceptions on their transition from secondary to tertiary education. This cross-sectional study entailed the use of reflective practice to promote metacognition in first year pharmacy students (Bachelors of Pharmacy students (n = 67)), at the University of Namibia's School of Pharmacy. Results of this study indicate the initial learning approaches of most students to be haphazard. Students used varied, non-departmental resources to guide their learning whilst a few followed structured learning approaches. Results further indicate that students' gradual transition and evolving metacognition appear to start during the initial few months of tertiary education. This transition appears to include feelings of apprehension, uncertainty and distress. Reflective practice creates awareness amongst students of possible gaps in their learning approaches and promote the value of anatomy as an undergraduate subject. Data suggests that the formal incorporation of reflective practice as a metacognitive learning activity promotes students' metacognition by elucidating possible gaps in their learning approaches.

Keywords: Learning approaches, anatomy, pharmacy students, reflective practice, metacognition

INTRODUCTION

The core biomedical subjects, anatomy, physiology and biochemistry, enable students to become proficient in courses such as clinical pharmacy and pharmacology (Reinke et al., 2014). Students typically find these subjects challenging and either adopt an effective study system at tertiary level or fail to do so and ultimately withdraw as a result (Reinke et al., 2014). One primary reason for this is students' inability to self-direct their learning (Naug et al., 2011). Furthermore, the challenges associated with the transition from secondary to tertiary education is sometimes under appreciated. Educators often feel that students are poorly prepared for this change and the need to establish programmes aimed at aiding their transition has been highlighted (Brinkworth et al., 2009). Krause et al. (2005) found that 60% of first-year university students in Australia feel ill-prepared for life as a university student. The first semester's marks typically serve as a "reality shock" as noted in their study (Krause et al., 2005). Others noted that the first academic year, regardless of the

programme, is crucial for students' academic development and it also forms the foundation upon which future academic successes rest (Krause et al., 2005; Reason et al., 2006). Mechanisms need to be in place that allow students to bridge the gap and facilitate the successful integration into the university environment. Yet, strategies are needed that extends beyond the conventional university orientation programs in order to promote students' metacognition (Brinkworth et al.; Hunt et al.; Naug et al., 2011).

Metacognition refers to the learner's mindfulness of the development of their learning. It also refers to the capacity of students to control and manage their own learning (Georghiades, 2004). Students who exhibit metacognitive approaches in their learning, i.e. planned learning activities, scrutinizing their understanding and employing reflective practice, gain a deeper understanding and become autonomous learners (Ross et al., 2006). This autonomy or

self-regulation is known to be a predictor of academic success (Naug et al., 2011). The application of reflective practice, from a metacognitive perspective, enriches the learning of anatomy, promotes a deeper understanding of anatomical concepts, enhances critical thinking, and promotes learning through the enhancement of confidence (Lachman and Pawlina, 2006). The formal integration of reflective practice further consolidates the gap between theory and practice and inspires student-centred learning. The inclusion of the latter is extremely important for educators wishing to shift from a more didactic approach to fostering self-directed learning amongst students (Lachman and Pawlina, 2006). Furthermore, the ability to characterise students' learning approaches has the potential to enhance the overall educational experience by guiding educators to tailor their teaching approaches and initiate possible remedial interventions (Romanelli et al., 2009; Atlasi et al., 2017). The aim here, through the formal inclusion of reflective practice, is to provide insights to pharmacy students' initial approaches to studying anatomy, promote their metacognition as well as their perceived value of anatomy as a subject. Furthermore, the study also aimed to contextually capture students' perceptions and reflections of the transition from secondary to tertiary education based on their first-year foundational anatomy programme.

METHODS

Namibian Context

The anatomy foundation programme at the University of Namibia (UNAM) consists of three major themes: cells, tissues, and organs and organ systems. This course is concurrently presented to Medicine and Bachelor of Surgery (MBChB) and Bachelor of Pharmacy (BPharm) students during their first semester of their first academic year. It serves to convey fundamental anatomical concepts. The MBChB students typically and without question appreciate the importance of anatomy in their undergraduate degree programme. However, we as educators are often confronted with the BPharm students' interrogations on why they have to study anatomy. In addition, the selection criteria based on academic merit, of these two programmes differ significantly. The MBChB candidates are required to obtain higher entry scores (a minimum of 35 UNAM points) compared to the BPharm candidates (a minimum of 30 UNAM points). It is for this reason that some BPharm students find the anatomy programme more challenging compared to the MBChB students. We therefore established a reflective element to the first-year anatomy course to aid students to become more aware of their learning. We furthermore wanted to know how their learning approaches evolve when facing the challenges of transition from secondary to higher education, and how they perceive the importance of anatomy as a subject.

Reflective Practice

First-year Bachelors of Pharmacy students (n = 68), at the University of Namibia's School of Pharmacy (SOP), were tasked to complete a reflective assignment as part of their continuous assessment grade for their year one (first semester) foundational anatomy programme. The Department of Anatomy felt that the inclusion of such an assignment would trigger students to reflect upon their learning experience and transition to higher education and thus promote their metacognition. Participant data were collected anomalously and the study was conducted in accordance to the Declaration of Helsinki and its amendments (World Medical Association Declaration of Helsinki, 2013) The breakdown of participants' age and gender were as follow: 20 males; 34 females; 14 individuals who did not indicate their gender; and the age range was from 18 to 38 (mean = 20, SD ± 3.47, and mode = 19). All students were provided with instructions and online resources to familiarise themselves with Gibb's cycle of reflective practice (Gibbs, 1988). A formal lecture on reflective practice followed their self-directed learning and was aimed at reinforcement and to address any arising concerns and uncertainties.

First-year Pharmacy students were asked to complete three major tasks, once-off, after their first summative assessment, and consisted of the following:

1. In your own words, reflect on how are you finding year 1 so far? Is Medical School or School of Pharmacy different to what you expected? How and in what way?

2. Reflected on how you prepared for the anatomy assessments? Can you identify some positive features of your learning or new approaches you want to try? Did this reflective exercise help you to identify any areas for improvement? Do you feel confident about your self-directed learning?

3. Given your experience with attending anatomy lectures and practical sessions, reflect on why you think anatomy is important in your education? In what way do you think your anatomy knowledge will influence your future career?

The reflective tasks were qualitatively analysed through an inductive approach (Burnard et al., 2008). One student did not complete the assignment and a total of 67 reports were randomly assigned to the authors and thematic content analyses were performed in order to identify emerging themes. The process was again repeated to identify further emerging themes and categories (Pope et al., 2000). Processing entailed general familiarisation with the data, the generation of initial codes and validation, the identification of these themes amongst the codes, a review of these themes and the naming of themes, and finally the production of a final report (Burnard et al., 2008). The frequencies of the emerging themes were documented and reported through the use of descriptive statistics.

RESULTS

Students' reflections on how they were finding their first academic semester were dominated by feelings of distress (Table 1). The majority, (n = 44) of the respondents stated that they find it challenging to some extent (Table 1). The major contributing factor appears to be the workload with students (n = 25) explicitly, stating that they found the quantity of academic work daunting. Some students (n = 19) felt that the stresses associated with the onset of their academic career was linked to poor time management whilst surprisingly few ascribed it to social obligations or financial issues. Few students (n = 8) did state that they experienced their academic studies exciting or positive (Table 1). Only 14 students unequivocally stated that the reflective exercise aided them in identifying gaps and areas in need of improvement when preparing for assessments. Less than half of the students (n = 32) felt that they are confident in their self-directed learning, whilst (n =10) did not. A total of (n = 23) did not respond and only (n = 2) felt unsure.

Table 1: Students' perceptions of the first semester

Themes	n, frequency(%)
Positive/ecstatic/exciting/amazing/privileged	8, (12)
Time/long hours/time management	19, (28)
Workload	25, (37)
Negative/stressful/tough/difficult/challenging/hard/over whelming	44, (66)

Free text comments (Table 2) provides insight to students' perceptions on the transition from secondary to tertiary education. The perceived differences appear to relate to the educational

system, mode of academic teaching, volume of academic content, and the relevance of academic work (Table 2). One respondent paraphrased Coombs (1998) and noted that (Coombs and Virshup, 2000): "High school is like a lawn sprinkler. College is like a garden hose. And School of Pharmacy is like a fire hose of information."

The academic resources used by the students varied despite being provided with a formal study/learner guide that outlines the themes, recommended resources and individual learning objectives. There were 12 students who clearly stated that they incorporated the study guide in their preparation for both assessments at the time of the study (Table 3). Some students, (n = 9) explicitly stated that

they did not use the study guide during their preparation. The remaining students (n = 46) did not provide feedback on study guide use during their preparatory work (Table 3). There were, however, students (n = 14) that used alternative approaches such as a non-departmental study guide and prescribed textbooks or previous test/examination papers (Table 3). Relatively few students (n = 17) stated that they used the lecture slides and class notes as a primary resource when preparing for assessments. Several students (n = 23) found study groups (peer learning) useful during their learning. Students who incorporated online videos/tutorials, specifically YouTube©, totalled 20 (30%) (Table 3).

Table 2. Students' perceptions of the differences between secondary and tertiary education.

Free text comments
"Expected dispensing meds"
"Undeniable gap between high school and university"
"The learning system has changed"
"Quite a rollercoaster"
"I have grown as a person and as a professional"
"The pressure was enormous"
"Being used to spoon feeding of high school"
"High school mentality is still in me"
"The roles of the lecturers is basically to introduce and highlight certain concepts"
"But most of all a time filled with discovery, determination and inspiration"
"I wish I did a preparatory course before coming to SOP"*
"Are pharmacist expected to know the same things as doctors?"
"Transition from high school to university has not been easy"
"Lecturers teach in a totally different way compared to high school"
"In high school teachers are immediately available if you have a problem"

* SOP = School of Pharmacy

Table 3. Learning resources employed by the students.

Learning approaches	n, frequency (%)
Flashcards	1, (1)
Used study guide	12, (18)
Alternative study guide/textbook/previous tests	14, (21)
Lecture slides	17, (25)
Study groups/peer learning/sharing insights	23, (34)
Online videos/tutorials/YouTube©	20, (30)

The second task required students to identify positive features, if any, of their self-directed learning and possible new approaches they employed when preparing for the second assessment opportunity. Many students (n = 48) reported that they changed their learning approaches whilst some (n = 22) did not do so. Some of the new approaches that were employed or suggested, related to ways to capitalise on didactic lectures (Table 4) and included: improved note taking (n = 2); more attention during lectures (n = 3); more attention to detail (n = 4); and ask for clarification (n = 7). Improved resource use included the use of previous question papers (n = 8) and additional learning resources (n = 8) (Table 4). Students also noted that their learning approaches changed as follow: studying everyday (n = 8); designing a study plan (n = 9), and making use of a study group (peer learning) (n = 23) (Table 4).

Students identified various gaps in their learning approaches (Table 5). Of interest is that one student noted that a change in sleeping patterns might be helpful. Students identified a lack of self-management (n = 30), including poor time-management as a major hurdle. Inadequacies in their self-directed learning (n = 11) including learning too wide and not preparing for the sessions were also documented (Table 5). Students commented that they have "no idea about the content of the modules" and some "find it difficult to balance all my modules". Students (n = 32) furthermore identified inadequate use of resources as a gap in their learning approaches and 2 students specifically stated that they studied too wide (Table 5).

Table 4. Positive features in students' self-directed learning.

Areas for improvement	n, frequency (%)
Improved resource use	16, (24)
Capitalising on lectures	16, (24)
Learning approaches changed	32, (48)

Table 5. Perceived gaps and areas of improvement in students' self-directed learning.

Areas for improvement	n, frequency (%)
Inadequate self-directed learning	11, (16)
Lack of self-management	30, (45)
Inadequate use of resources	32, (48)

When asked to provide feedback on their experience of attending anatomy lectures and practical sessions; most students stated that anatomy has a positive influence on their education in several ways. A total of 47 students (70%) stated that anatomy serves to provide an understanding how the human body functions (Table 6). In addition, several students stated that anatomy helps them with other related subjects and increases the confidence they have with self-directed learning (n = 5) (Table 6). Students believe that anatomy is a fundamental module in for their enrolled programme (n = 19) and has a critical role in their studies and prospective careers. The different practical and theoretical dimensions of learning incorporated in the module appealed to many of the students (n = 14) (Table 6).

Finally, students were asked to reflect on how they believe anatomy will influence their future career. Most students (n = 42) believe that anatomy will significantly aid them in their future careers as pharmacists by understanding drug interaction with the human body and prospective medical research on a pharmaceutical front. Many students (n = 22) believe that anatomy is the foundation of all medical fields (Table 7). Some students (n = 5) stated that anatomy teaches them the first ethical considerations medical professionals should have for prospective patients and critical lab techniques they may need in their

career. There were, however, students (n = 3) who believed that anatomy is not critical for pharmacists and is only significant for medical practitioners or nurses (Table 7).

Results from the current study indicate that the majority of students found the first academic semester daunting in terms of work load but gradually settled in their new educational environment. Students' transition from secondary to tertiary education were dominated with feelings of distress, apprehension and uncertainty. Very few students made use of resources provided by the Department of Anatomy such as the module guide, and the recommended and suggested learning resources. Lecture slides and module guides are critical tools used to communicate the requirements and, in part, the knowledge that students require to successfully complete the module. This is a contributing factor to students struggle to cope with the workload and finding the module daunting and stressful. Very few students were able to effectively apply self-directed learning techniques and manage their time efficiently. Students are challenged with the emotional maturity required to cope with the pressure and significant increase in workload demanded by tertiary education. Most students at UNAM SOP do not know how to manage their time correctly.

Table 6. Students' perceived value of anatomy in their undergraduate learning experience.

Emerging themes	n, frequency (%)
Teaches time management/prioritising content.	5, (7)
Anatomy is a critical/important/fundamental module.	19, (28)
Aids in learning/reinforces the theory/ aids with other subjects/understanding relationship between structure and function.	47, (70)

Table 7. The value of anatomy in their future career as pharmacists.

Emerging themes	n, frequency (%)
Only relevant for medical doctors/what is significance for pharmacists?	3, (4)
Teach ethical consideration/lab techniques	5, (7)
Anatomy is the foundation of all medical fields	22, (33)
Supply correct medicine/correct treatment for patients	42, (63)

DISCUSSION

Results from this study indicate that self-management appears to be the primary barrier for many at UNAM's SOP. This leads to work-pile up, procrastination and increased stress around and during the time of assessments (Clinciu et al., 2014). The first few months of university overwhelms countless students, and some face personal and/or financial pressures associated with adulthood (Clinciu, 2013; Pasha and Munaf, 2013). Data from this study suggests that some of our first-year students face similar challenges. Students' academic and emotional challenges at UNAM SOP also appear to be linked to a deficit in their secondary schooling. Free text comments suggest that some students carry the burden of an ill-equipped educational system in some schools in Namibia. There appears to be misalignment between secondary schooling and higher education systems, particularly related to mathematics, other basic science subjects, and English (Katjavivi, 2016). Data from this study also suggest that students' transition to become adult learners appear to develop during the initial few weeks of tertiary education. This transition was met with initial feelings of distress for most. An encouraging finding points towards students' transition in their learning approaches. These approaches change over time to include the recommend course material, online platforms and more structured self-directed learning; thus, evolving to become multi-modal. The use of online resources, however, is less than what the authors expected and corresponds to the findings of others (Atlasi et al., 2017). Gender-based differences were not explored and is a possible limitation of this study. This, along with overall academic progress, could be explored by others.

Of importance is one student's comment - "I wish I did a preparatory course before coming to SOP" – reiterates the need to establish a tailor-made induction course. How then,

according to Brinkworth and colleagues (2009), "can the expectations of first-year students be better balanced and integrated"? (Brinkworth et al., 2009). Several strategies have come to light during recent years and the work of Krause (2005), for instance, found that a written assignment along with constructive feedback encourages integration of content in text-based courses (Krause et al., 2005). Work on the value of small collaborative groups, by Leveson (1999), demonstrates the value of such an intervention in assisting first-year accounting students with their course material (Leveson. 1999). The value of reflective practice, as exemplified here, serves as a further example of such an intervention. Despite the small number of students acknowledging the value of reflective practice within this study, the authors believe the data presented here indirectly supports the notion. This is achieved by creating awareness of specific gaps and limitations to their learning approaches as well as the importance of anatomy as a subject.

In conclusion the formal incorporation of reflective practice, as demonstrated here, highlights its value in elucidating possible gaps in their own learning approaches and facilitating students' development as adult learners, thus enchanting their metacognition. Reflective practice creates awareness. Such a student-centred educational principle has the potential to provide students with the educational experiences that will indorse the fruition of quality learning outcomes. The findings from this study emphasises the value of student-centred reflective practices as a resource to aid both students and academic staff. Both students and lecturers are able to conceptualise the contextual challenges faced by students, their learning approaches, and subsequently allow realignment of educational practices.

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