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Exploring Changes in Occupational Therapy Students' Approaches to Learning during Pre-registration Education.

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Abstract

This article describes a longitudinal cohort study that examined the preferred approaches to learning of pre-registration occupational therapy students (N=55) as they progressed through the three years of an undergraduate BSc (Hons) programme. Students' orientations to learning were measured using the Short Inventory of Approaches to Studying (ASI) (Entwistle 1981) and results were compared descriptively across repeat measures undertaken during each year of study. Inferential statistics are used to examine whether there were any statistically significant differences in preferred learning approaches throughout the three years of study. The results show moderate changes in learning approaches that are associated with more successful outcomes of learning. Evidence of the use of these deeper approaches to learning were accompanied by statistically significant decreases in less desirable, superficial approaches; with reductions in the mean scores between year one and year three for Operation Learning ($p < 0.005$) and Learning Pathologies ($p < 0.05$). The implications of the findings are discussed in relation to learning and teaching and assessment methods in undergraduate health professional education. Students may be encouraged to become more independent and to develop deeper approaches to learning by reducing formal contact time and developing assessment strategies that emphasise the exploration and application of knowledge.

Introduction

The aim of this cohort study undertaken in a BSc (Hons) Occupational Therapy (OT) degree programme was to determine whether students' approaches to learning change over the three years of the programme. Emphasis in the literature has previously been placed on developing creative student-centred teaching methods in order to enhance academic and clinical performance (Watson 2005, Martin et al 2004, Reeves et al 2004, Higgs & Edwards 2002, Bonello 2001, Paterson & Adamson 2001, Sweeney et al 2001). Less attention has been devoted to considering students' preferred learning approaches; how these develop throughout an undergraduate degree programme and the impact they may have on syllabus delivery or the achievement of relevant learning outcomes.

Literature Review

A search for relevant literature was undertaken using the International ERIC (1976–2005), Web of Science (1970–2005), Zetoc (1993–2005), PsychInfo (1985–2005), CINAHL(1982–2005), AMED (1985–2005), EMBASE (1980–2005) and MEDLINE (1976 – 2005), with key words 'learning styles', 'learning approaches', 'learning preferences' and 'occupational therapy students'.

Research into differing styles of learning and motivation to learn originates from the psychology field and has been evident for the last four decades. There has been little research into the application of these tested principles within the specific field of OT education. Readers are directed to Cassidy (2004) and Desmedt and Valcke (2004) for excellent reviews of theory, terminology and models regarding learning styles and preferences.

Approaches to Learning

Marton and Säljö (1976) conducted early research into approaches to learning and identified two types of learning that are still accepted today. They identified a surface approach to learning involving rote memorisation of specific information; and a deep approach in which the student seeks meaning and is actively involved in developing a conceptual understanding and application of information. A third, strategic approach to learning has also been identified, in which students focus their attention on the achievement of high grades, utilising a variable approach to learning selected on the basis of its potential to achieve success in a given assessment context (Newble & Entwistle 1986). It has been suggested that the match between learning environment, teaching approaches and preferred learning style is important (Curry 1999, Newble & Entwistle 1986) arguably not only to facilitate successful student outcomes in professional examinations, but also to enable effective continuing professional development as a competent therapist.

Within an extensive literature-base considering learning styles and approaches to learning, few studies have focussed on learning within the health care professions specifically. Given the significant practical skills element in OT education, the transferring of results from studies focusing on strictly academic programmes should be undertaken with caution.

What has emerged from the literature suggests that age and individual characteristics influence approaches to learning (Jamison & Durette 2004, Hardigan & Cohen 2003, Aaron & Skakun 1999, Cavanagh & Coffin 1994). Additionally, there is agreement that educational strategies and teaching methods influence the depth and successful application of learning (Ramsden 2003, Biggs 1999, Curry 1999,

Newble & Clarke 1986, Newble & Entwistle 1986). In investigations into learning styles in medical schools, researchers have demonstrated that new students tend to exhibit a preference for more superficial learning (Aaron & Skakun 1999); but that approaches to learning are not necessarily static and change may occur in adult learners over a one-year period (Severiens et al 2001). Coles (1985) demonstrated that over the course of undergraduate education some medical students in a school with a traditional curriculum actually moved away from a deep approach towards a more superficial, strategic approach in order to pass their assessments.

It is the deep approach to learning that educators are more likely to encourage because it is the most conducive to successful academic & professional development. Newble and Entwistle (1986) suggest that the way in which students learn and their subsequent success is partly attributable to their preferred approaches to learning. In a longitudinal study of two cohorts of medical students, Arnold and Feighny (1995) demonstrated that deeper learning approaches had a positive correlation with both high academic achievement (for both cohorts) and better clinical performance (for only one cohort).

Measuring Approaches to Learning

There have been many attempts to investigate learning styles and approaches to learning; and many instruments developed (Cassidy 2004, Desmedt & Valcke 2004). Curry (1999) points out that there is a need to differentiate between a learning style which is indicative of someone's typical performance (trait characteristic) and an approach to learning, which is a choice made according to the requirements of the task in hand (state characteristic). She discusses the conceptual differences between instruments that set out to measure 1) motivation for learning, 2) the

characteristics of the information processing involved; and 3) preferences for different types of instruction (Curry 1983). An instrument focussing particularly on identifying the level and depth of learning was developed by Entwistle and colleagues (Entwistle et al 1979; Entwistle & Ramsden 1983). It records both student motivation and information processing during a learning activity. The Approaches to Studying Inventory (ASI) identifies three approaches: deep learning in which understanding is sought; surface learning with an intention to memorise and reproduce; and strategic learning with a focus on the demands of assessments and an intention to excel.

The original ASI was a 64 item questionnaire with sixteen subscales grouped into three major areas: Meaning Orientation, Reproducing Orientation, Achieving or Strategic orientation; and further sub-grouped into Styles and Pathologies of learning. Responses are provided on a five point Likert scale where the most positive responses are given a value of 4; while the statements producing least agreement are given a value of zero (Entwistle & Ramsden 1983). The ASI has been used extensively in educational research in this country and is known to have moderately sound psychometric properties (Cassidy 2004, Coffield et al 2004, Duff 2000). The ASI has been adapted over time and there are several shorter inventories that have emerged. Test-retest reliability has been documented as ranging from moderate to good with reliability coefficients ranging from 0.40 to 0.78 on a 30 item version (Arnold and Feighny 1995).

'Meaning Orientation' is associated with deep learning and an intrinsic interest in the subject; while 'Reproducing Orientation' contains the features of a superficial approach. Similarly, 'Achievement Motivation' corresponds with learning approaches

regarded as being strategic and aimed at the achievement of successful assessment outcomes (Newble & Entwistle 1986).

Deep learning is characterised by two distinct approaches: 'Operation Learning' involves a logical, step-wise approach and becomes a deep approach to learning when combined with an acceptance of generalisations only with sound supporting evidence. 'Comprehension Learning' adopts a broad focus considering interconnection of ideas and previous knowledge. The most successful 'Versatile' learners are those who are able to adopt either of these two approaches where appropriate.

Learning Pathologies become evident in a number of ways. Students who show 'Improvence' adopt the step-wise element of an Operation Learning approach but fail to understand the interrelationship between concepts and ideas; and therefore develop a limited view of the topic. 'Globetrotting' students predominantly use Comprehension Learning, but tend towards a superficial approach in which premature conclusions are drawn without appropriate supporting evidence (Newble & Entwistle 1986, Newble & Clarke 1986).

'Prediction of Success' combines various subscales in the inventory: the competitive element of Achievement Motivation, learning for comprehension and meaning along with the emphasis on facts and logical analysis found in Versatility; moderated by the score for Learning Pathologies. 'Elaboration' is the ability to link material in order to expand understanding.

Approaches to Learning in Occupational Therapy Education

There have been only a handful of previous studies examining the approaches to learning adopted by OT students; all of which are based in the USA (Jamison & Dirette 2004, Hardigan & Cohen 2003, Barris et al 1985). Previous literature, including more generic studies unrelated to OT education, seem to suggest that in busy curricula learning can be assessment driven; and that deeper more meaningful learning that is likely to prove more relevant to clinical and professional development may be hindered as a result (Ramsden 2003 p182, Seale et al 2000, Biggs 1999 p141, Gibbs & Habeshaw 1989 p92).

It is to be hoped that students on pre-registration OT programmes will move from possible early rote learning approaches, to a more reflective and analytical approach (congruent with ongoing development in professional practice) during their undergraduate studies. Examining learning approaches that students enter their degree programmes with and determining whether these approaches change during pre-registration education may have implications for developing methods of teaching to optimise student learning, clinical reasoning skills and ongoing professional development. To date, there has been no investigation into OT students' preferred learning approaches upon entry and whether these changes as they progress through an honours degree programme.

This study was a small longitudinal cohort study which aimed to examine the progression of one cohort of undergraduate OT students' preferred approaches to learning over the three years of their pre-registration education, in order to provide evidence for reviewing the structure and delivery of the curriculum.

Research Questions

What are the preferred approaches to learning of OT students undertaking an undergraduate Honours degree programme and is there a difference, as measured by the short ASI (40 item), over the three years of the programme?

Ethical approval

Prior to data collection, ethical approval was awarded by an established ethics committee within the facility under investigation.

Methodology

The study drew participants from a three-year, modular based pre-registration BSc (Hons) Occupational Therapy degree programme. All students in a single cohort of new undergraduate OT students (N=55) were asked to voluntarily complete the short 40 item ASI self-report questionnaire on three occasions during their programme of study: within two weeks of commencing the course, at the beginning of their second year, and again shortly after graduation from their third and final year.

Consent to participate in the study was assumed by the completion and return of questionnaires. The short ASI took no more than 10 minutes to complete. Students used their Student ID number to maintain anonymity. In years one and two, questionnaires were distributed by the primary investigator who was a physiotherapy lecturer in the School. In the final year students were sent a copy of the questionnaire within three months of graduation, along with a covering letter from the primary investigator inviting participation and assuring anonymity via the use of student numbers. They were supplied with a stamped, addressed envelope to facilitate returns.

Data Analysis

Data from the questionnaires was scored according to the standardised protocol and analysed using the Statistical Package for the Social Sciences (SPSS) data base (SPSS version 11.0 Chicago Inc). The scored questionnaire responses provided an interval level of measurement, and preliminary analysis revealed it to be normally distributed. Descriptive statistics (range, mean and standard deviation) present the summary scores for the primary ASI subscales for each year group. As there was variability in the students who completed the questionnaire at each episode of data collection, the three years have been treated as different groups. Analysis of Variance was used, applying a post hoc Bonferonni analysis for significant ($p < 0.05$) findings, as recommended by Field (2000).

Results

Baseline demographic information of the three years is presented below in Table 1. Table 2 describes the ranges of scores for the primary ASI subscales between the years and presents p values for the differences between year groups.

Table 1: Demographic information of the three year groups.

Table 2: Range of scores across ASI dimensions between years, with p values for the differences between year groups.

In all dimensions except dimension Achievement Motivation there was a decrease in the overall mean score between year one and year two. Achievement Motivation increased from 17.42 to 17.87 (not statistically significant); although between year

two and year three, the overall mean score in this dimension fell to below that of year one (17.00) (Table 2). Despite an overall decrease (not statistically significant) in the dimension of Versatility between years one and three, there was an improvement in the score from year two (35.86) to year three (36.32). 'Prediction of Success' which combines Achievement Motivation and Versatility was the only dimension to show an increase in the mean score between year one (71.76) to year three (72.65), although this was not statistically significant.

Table 3: Multiple Comparisons Bonferroni

Table 3 reveals statistically significant differences between year groups within the Operation Learning ($p < 0.005$) dimension and the Learning Pathologies ($p < 0.05$) dimension. There were no other statistically significant changes in learning approaches between year groups within the cohort of students.

Discussion

Educational theorists espouse the benefits of developing independent, autonomous learners. Expectations laid out in the Health Professions Council's (HPC) Standards of Proficiency for Occupational Therapists (HPC 2004) identify the responsibility of professionals to maintain and enhance their competence and effectiveness as clinicians by becoming reflective, independent thinkers who challenge and develop their practice throughout their careers. It is to be hoped therefore, that the learning and teaching methods presented to undergraduate students during their programmes of study will facilitate the development of appropriate skills in this area.

The aim of this study was to determine whether OT students' approaches to learning change during their undergraduate programme. Analysis of the data revealed little statistically significant change in students' approaches to learning between the first and the third year; however there was a modest overall trend towards the development of approaches considered to be associated with deeper learning.

Over the three years, the superficial strategy of Reproducing Orientation was seen to decrease steadily each year. It seems that by the beginning of year two, students had adopted a more strategic approach which focused on exam success, as seen by the increased score in Achievement Motivation between year one and year two. Scores in this dimension then declined in the final round of data collection; suggesting that students may be looking for more meaning. This hypothesis however, is not directly supported by the parallel decline in Meaning Orientation and Comprehension which are dimensions associated with deep approaches to learning.

More supportive evidence for the hypothesis seems to come from the increase in Versatility scores between year two and year three; coupled with the significant decline in Learning Pathologies during this period. It is proposed that the decline in Operation Learning is not *necessarily* a negative feature. Newble and Clarke (1986) demonstrated a significantly higher Operation Learning score in students studying on a traditional medical programme at year three. This finding was associated with an increase in the pathology of Improvidence; reinforcing that Operation Learning can be focused solely on superficial, sequential strategies. It may be therefore, that the decline in Operation Learning seen in this cohort, accompanied by a decline in Learning Pathologies, indicates a move away from a step-wise approach toward a deeper evidenced-based approach to learning.

Prediction of Success was seen to drop very slightly in year two, paralleling the increase in Achievement Motivation and the decline in Versatility at that point.

Overall, however, the dimension shows an increase beyond the year one scores by the third year. Although this was not statistically significant, it is linked with reduced focus on exam success (Achievement Motivation) and with greater emphasis on understanding (Versatility).

Contextualising Approaches to Learning

It would be misguided to consider approaches to learning without also considering the environment in which learning takes place. The context in which learning occurs plays a significant role in determining the approaches that students adopt. The two primary aspects of the learning environment that receive repeated attention in the literature in this regard are student workload and assessment formats (Ramsden 2003, Biggs 1999, Curry 1999, Newble & Entwistle 1986, Newble & Clarke 1986). Students need time to think and to consolidate learning and to be able to apply it in different situations. If they are put under undue pressure to complete tasks within limited timeframes, or are presented with a syllabus that emphasises coverage and high contact hours, superficial approaches to learning are a predictable outcome. Tan and Thanaraj (1993) point out that in the absence of sufficient time to grapple with complex ideas, crammed curricula can lead to simplification of concepts by students and a fear of failure that may prompt the avoidance of difficult tasks. Further, they suggest that the same demanding curriculum may force students to seek more strategic approaches to studying focused on securing examination success.

Early indicators that this cohort of students moved towards a more strategic approach between year one and year two may therefore be a consequence of the learning and teaching strategies and modes of assessment to which first year students were exposed. At that time, the course seemed to focus predominately on the acquisition and reproduction of facts in an attempt to develop an appropriate knowledge-base from which to launch professional practice. The newness of much of the material may have made it difficult for students to identify links between concepts; and the heavily contacted timetable may have encouraged students to adopt a preference for acquiring information in a structured, step-wise manner in an effort to keep up.

Such a learning environment might also account for the decreased Versatility score in the first year. Work by Coles (1985) also showed a significant decline ($p < 0.001$) in the Versatility scores of a group of medical students in a conventional programme over the first year of their training. Students in a problem-based programme demonstrated significantly higher Versatility score than the conventional group by the end of year one ($p < 0.01$). This suggests that experiencing a full, factually based curriculum during the first year may have a detrimental influence on students' study habits. Coles (1985), Newble and Clarke (1986), and Titchen and Coles (1991) all demonstrated a dramatic shift towards the use of superficial approaches with rises in Reproducing Orientation in the first year of traditional programmes. Despite the demands of their programme, the cohort in this study however, tended to adopt a more strategic rather than superficial approach in their first year (as demonstrated by an increase in Achievement Motivation accompanied by the decrease in Reproducing Orientation).

Approaches to Learning and Assessment

It is widely acknowledged that assessment formats also have a profound effect on the approaches to learning adopted by students. If assessments focus on recall of factual knowledge, memorisation of these facts will become the focus of student attention, drawing those who might otherwise focus on developing understanding towards this more strategic approach. Biggs (1999) stresses the importance of constructive alignment where learning activities and assessments are aligned to specific learning outcomes designed for that level of education. In the first year of the programme being considered, students needed to grasp the foundation sciences underpinning clinical practice and this primarily emphasised the demonstration of an acquisition of facts. At the time of this study, the assessment in this area dominated student attention and was based almost entirely on factual recall and recognition; inevitably driving students to be strategic in their learning.

During successive years of study, the programme aimed to encourage students to engage in higher order learning and critical thinking such as application, analysis, synthesis and evaluation (Bloom 1956) in order to accommodate the uncertainties of clinical practice. Demonstration of greater Versatility by the students towards the end of the programme suggests a more flexible approach to learning, which may reflect these advanced demands of the programme. The significant reduction in Operation Learning coupled with the smaller significant decrease in Learning Pathologies would also seem to indicate that by the end of their pre-registration education, students were able to contextualise material and recognise useful interrelationships between concepts.

Despite a lack of change in Comprehension Learning, the students demonstrate a more balanced approach in their learning resulting in a small positive change in the Prediction for Success. The changes observed in Achievement Motivation (increased in the first year, but decreased overall by year three) suggest that students moved from being solely focussed on passing their exams to seeking a broader, more integrated understanding of the syllabus. However, caution must be exercised in the interpretation of these results as the ASI merely asks students to reflect on their approaches to studying and may not actually represent what they do in practice (Newble & Clarke 1986).

Implications for educational practice

Our findings suggest that the strategies that have been adopted in teaching undergraduate students could be challenged. It is suggested that analysis of the framework in which learning occurred over the three years may highlight that greater emphasis on contextualising information and demonstrating links to clinical practice would be beneficial to the development of student understanding. Examining the alignment between changes in approaches to learning evident in this cohort and the context of their actual educational and assessment experiences across the three years will be the subject of a further paper.

Limitations

The findings of this work need to be viewed in light of the fact that the limited number of participants were drawn from one particular, modular-based pre-registration programme and therefore the results may not be generalizable to other programmes; particularly those adopting a problem-based approach. Nevertheless, the questions raised about the influence of learning and teaching strategies on student approaches

to learning are worthy of consideration in all programmes. There was some variation in the students who participated in each round of data collection which limits the depth of statistical analysis possible; and therefore the results only reflect trends within the cohort. Further, the sample size may have been too small to detect meaningful changes.

As the researchers were lecturing staff within the facility from which participants were drawn, it is possible that students may have felt compelled to participate in the study and provide what they perceived to be the desired information. However, the response rate was variable from year to year; and given the lengthy time periods between episodes of data collection, it is unlikely that participants would be able to accurately recall how they had previously completed the questionnaire.

The psychometric properties of the instrument have been identified as moderately sound, however instrument error may nevertheless account for some of the changes noted. Since this data was collected, the ASI has been superseded by revised versions which have updated the questions and terminology used.

Conclusion

We have seen that approaches to learning do change over time, so any attempt to match instructional style with initial student learning preferences is liable to be marginally effective at best; not least because of the range of learning approaches that may be evident within a classroom at any one time. If encouraging students to develop deep learning approaches is the desired outcome, it makes sense that the strategies that enhance this approach are the ones that are reinforced throughout

pre-registration years; while strategies promoting superficial approaches are positively discouraged (Biggs 1999).

With a tripartite requirement of ensuring fitness to practice, fitness for purpose and fitness for award, structuring the design and content of busy pre-registration OT courses such that deep approaches to learning are encouraged can certainly be challenging. It is not always easy to completely overhaul an established programme of study; but small incremental changes could arguably enhance the learning environment and support the development of deep approaches to learning. Evidence available in the literature suggests that a reduction in didactic teaching, a balanced workload, an increase in self-directed learning activities and assessments that focus on the demonstration of understanding and application of knowledge would all contribute to such an ambition (Ramsden 2003, Seale et al 2000, Biggs 1999, Gibbs & Habeshaw 1989). The pursuit of this vision in spite of any challenges can only benefit the profession by enhancing the quality of pre-registration learning and by promoting an attitude to learning that will encourage reflective practice and life-long learning in qualifying practitioners.

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Table 1: Demographic information of the three year groups.

Year Group	No. of participants (% of population)	Female:Male	Age mean (\pmSD)
One	48 (87%)	41:7	23 years (\pm 6.9 years)
Two	52 (95%)	45:4 (3 not known)	23 years (\pm 6.5 years)
Three	37 (67%)	30:5 (2 not known)	25 years (\pm 6.4 years)

Table 2: Range of scores across ASI dimensions between years, with p values for the differences between year groups.

All data are presented as mean \pm SD (range). Emboldened figures are specifically referred to within the text.

	Achievement Motivation (Range: 6-24)	Reproducing Orientation (Range: 6-24)	Meaning Orientation (Range: 6-24)	Comprehension Learning (Range: 6-24)	Operation Learning (Range: 6-24)	Versatility (Range: 12-48)	Learning Pathologies (Range: 12-48)	Prediction of Success (Range: 24-102)	Elaboration (Range: 10-40)
Year 1 n=48	17.42\pm2.14 (14 to 21)	16.00 \pm 2.39 (11 to 22)	17.90 \pm 2.15 (12.to 22)	16.33 \pm 1.85 (11 to 21)	17.07\pm2.01 (12 to 21)	36.71 \pm 3.31 (28 to 44)	30.56\pm3.99 (23 to 41)	71.76\pm5.92 (60 to 86)	30.09 \pm 3.48 (24 to 39)
Year 2 n=52	17.87\pm2.24 (14 to 21)	15.80 \pm 1.92 (12 to 19)	17.29 \pm 2.52 (12 to 21)	16.28 \pm 1.71 (12 to 20)	16.00 \pm 1.62 (12 to 19)	35.86\pm4.23 (28 to 43)	29.81 \pm 3.23 (22 to 35)	71.63 \pm5.31 (62 to 81)	30.07 \pm 4.09 (18 to 40)
Year 3 n=37	17.00 \pm 2.72 (10 to 21)	15.62 \pm 2.98 (11 to 23)	17.22 \pm 2.90 (9 to 23)	16.00 \pm 1.82 (12 to 20)	15.58\pm1.96 (12 to19)	36.32\pm4.61 (26 to 44)	28.18\pm4.59 (19 to 41)	72.65\pm9.24 (45 to 87)	29.83 \pm 4.51 (16 to 37)
P value	0.33	0.79	0.40	0.70	0.002	0.67	0.04	0.82	0.96

Table 3: Identifying the year groups between which the statistically significant differences lie using multiple comparisons Bonferroni.

Dimension	Year Group	Year Group	p value
Operation Learning	1	2	0.076
		3	0.003
	2	1	0.076
		3	0.693
	3	1	0.003
		2	0.693
Learning Pathologies	1	2	0.753
		3	0.040
	2	1	0.753
		3	0.309
	3	1	0.040
		2	0.309