Encouraging Deep Learning by Using Appropriate Assessment Strategies.

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Published
2003

Conference Title
N/A

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Encouraging deep learning: A comparison of traditional and non-traditional teaching and learning methods

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Abstract: The present study compared non-traditional teaching and learning methods (involving project-based learning) with traditional methods, and examined their effect on students’ approaches to learning. The study also investigated whether particular teaching, learning and assessment (TLA) methodologies contributed to deeper approaches to learning. Seventy psychology students participated in the study, 50 of whom completed pre- and post-Study Process Questionnaires (SPQ) (Biggs, 1987b) to measure for shifts in deep learning in a traditional and non-traditional course. Seventy participants completed a SPQ in the non-traditional course and rated the effectiveness of six teaching and learning components (field work task, field work supervision, learning group contract, learning group experience, lectures, and peer teaching sessions) and three assessment components (applied essay, peer teaching session, and short answer examination) of the course. Results indicated that non-traditional methods, compared to traditional methods, resulted in an increase in deep motives, deep strategies and deep-related approaches to learning. In addition, results indicated a trend for surface learners, compared to deep learners, to move toward deep approaches to learning and a significant increase by surface learners in deep strategies for learning. Contrary to hypotheses, however, results indicated that none of the individual TLA methodologies examined in the non-traditional course were, on their own, predictive of deep motives, strategies or approaches to learning. This finding was interpreted as indicating that students perceived all TLA methodologies to be equally effective in facilitating deep learning. Implications for theory and practice of effective teaching in higher education are discussed.

Interest in the area of teaching and learning effectiveness has grown substantially over recent years. In particular, many researchers have examined the way in which students approach their learning (e.g., Biggs, 1989, 2003; Entwistle & Ramsden, 1983; Thomas & Bain, 1984) and the situational and environmental influences that can influence those approaches (e.g., Biggs & Rihn, 1984; Dart & Clarke, 1991; Newble & Clarke, 1986).

The three constructs of deep, surface and achieving, each comprising a motive for learning and an associated strategy, are the most widely accepted terms used to describe approaches to learning (Biggs, 1987a; Kember & Gow, 1989; Ramsden & Entwistle, 1981). A number of researchers proposed that a deep approach to learning is preferable because it results in meaningfulness in learning material (e.g., Biggs & Rihn, 1984; Gow & Kember, 1990; Sobral, 1995), depth of processing (Collier, 1985), is more compatible in meeting the aims of higher education (Baird, 1988; Collier, 1985; Percy & Salter, 1976), provides personal satisfaction with performance (Biggs, 1982), and results in higher academic achievement (Thomas & Bain, 1982; Watkins & Hattie, 1980). These studies show the desirability of students adopting a deep approach to learning and provide reason for attempting to influence a student’s approach if it does not incorporate a deep learning strategy. Although there has been considerable debate as to whether approaches to learning are stable styles of learning (Thomas & Bain, 1982) or strategies adopted for specific learning tasks (Marton & Saljo, 1976; Thomas & Bain, 1984), there is growing evidence for both a degree of consistency and an element of flexibility in approaches to learning (Entwistle, Hanley & Hounsell, 1979; Kember & Gow, 1989).

The teaching and learning environment has been investigated as a key factor in influencing approaches to learning (Biggs, 1989, 2003; Newble & Clarke; 1986; Ramsden, 1992). Several writers have reported practices that encourage surface approaches including teaching style and teacher/student relationships (Entwistle & Ramsden, 1983), lack of freedom or independence in learning (Ramsden & Entwistle, 1981), heavy workload...
(Dahlgren, 1984; Watkins & Hattie, 1980), and assessment processes (Ramsden, 1979). Other studies have indicated that deep approaches can be influenced by modifying the learning environments (e.g. Biggs & Rihn, 1984; Dart & Clarke, 1991). For example, Dart and Clarke (1991) aimed to improve the depth of learning of tertiary students by modifying their learning environments. They found that by introducing a variety of non-traditional experiences (such as negotiation of the curriculum, peer discussion and teaching, learning contracts, and self, peer and collaborative assessment) students increased their deep motives and strategies, deep approaches and deep-achieving approaches to learning (although the increases were not significant). There are several limitations to Dart and Clarke’s study, however, that bear consideration in interpretation of the findings, viz. students “selected” to join the program after details had been outlined, students were made aware of “approaches to learning”, and they did not include a control group. Biggs and Rihn (1984) attempted to assist undergraduates become more efficient learners by changing their approach to learning via the introduction of particular skills such as time management, goal setting, self-management, concentration and memory, and problem solving. They found that deep motives increased and surface motives decreased (but neither significantly) and deep and achieving strategies and deep approaches increased significantly. However, a 20% attrition between pre- and post-testing and a pilot study that showed deficiencies in strategies involved in deep learning may have influenced these results. It is also important to note that although shifts toward deep learning occurred in these studies, the relative contribution of individual teaching, learning and assessment (TLA) methodologies have not been measured.

The first purpose of the present study was to compare non-traditional teaching and learning methods, involving project-based learning, with traditional teaching and learning methods and their effect on students' approaches to learning. The second purpose of this study was to investigate the contribution of particular TLA methodologies, in project-based learning, that enhance deeper approaches to learning.

**Method**

**Participants**

Fifty-seven female (age range 19-49, mean 21.89 years, SD = 6.05) and 14 male (age range 19-41, mean 24.7, SD = 7.7) third year psychology students participated in the study on the basis that they were enrolled in a non-traditional course (Community Psychology). Of those 71 participants, 40 females (age range 19-44, mean 21.45 years, SD = 5.11) and 10 males (age range 19-41, mean 23.6 years, SD = 7.23) participated further in the study on the basis that they were concurrently enrolled in both the non-traditional course and a traditional course (Psychological Assessment).

**Materials and procedure**

Two courses, with contrasting TLA environments, were selected for comparison. The “non-traditional” course applied action learning principles, with a major component being completion of a field work task in learning groups. The teaching strategies involved interactive lectures, class discussion and peer teaching, and assessment items included an applied essay and preparing and presenting a peer teaching session. The comparison course employed a “traditional” approach to TLA with its structure of lectures and tutorials, and its emphasis on multiple choice and short answer examination for assessing students’ learning.

Using a comparison group methodology, where the same students in the two contrasting courses participated, enabled a number of key variables to be held constant, viz. faculty and discipline of study, participant’s characteristics such as age, gender, number of years since completing secondary education, and year and semester of study in a degree program – all of which have been found to influence approaches to learning.
Independent evaluations from previous teachings of the two courses were used to test for other potential confounding variables. In particular, there were non-significant differences between the courses in ratings of overall course effectiveness, teacher effectiveness, relevance and importance of course content, and workload.

Participants completed the Study Process Questionnaire (SPQ) (Biggs, 1987b) as pre- and post-test measures of approaches to learning in weeks 1 (pre-test), 13 (post-test in the non-traditional course) and 14 (post-test in the traditional course) of semester. The pre-test required participants to complete the SPQ in terms of their "typical approach to learning", with the post-tests asking participants to consider "their approach to learning in the course Psychological Assessment" (traditional), and "Community Psychology" (non-traditional).

Participants also completed rating scales (from 1 “not at all effective” to 7 “extremely effective”) on which they indicated the effectiveness of nine teaching and assessment components of the non-traditional course. The teaching/learning components included a field work task, field work supervision, a learning group contract, learning group working experience, lectures (including those by invited guest practitioners from the field), and peer teaching sessions. The assessment components included an applied essay, a peer teaching session, and a short answer examination. Participants also provided qualitative feedback on their learning experiences in the non-traditional course in terms of written feedback and focus groups.

Results

Multivariate analysis of variance (MANOVA) was used to test for any changes in deep-related approaches to learning over the semester, in the traditional and non-traditional courses. In regard to deep motive and deep strategy (as combined DVs), the multivariate F was significant (Wilks’ Lambda F(2,91)=3.93, p<.05), with univariate analyses revealing significant main effects for both deep motive (F(1,92)=7.02, p<.01) and deep strategy (F(1,92)=5.34, p< .05). In regard to deep approach and deep-achieving approach, the multivariate F was again significant (Wilks’ Lambda F(2,91)=3.90, p<.05), with univariate analyses revealing significant main effects for both deep approach (F(1,92)=7.89, p<.01) and deep-achieving approach (F(1,92)=4.91, p<.05). These results, confirmed by examination of the means, indicated that non-traditional teaching and learning methods, compared to traditional teaching and learning methods, resulted in an increase in deep motives, deep strategies and deep-related approaches to learning.

To examine whether these shifts in deep learning were produced equally by deep and surface learners, two further MANOVA’s were performed. Students were categorised as either "deep" or "surface" learners according to their pre-test SPQ scores. Of the 50 cases, 29 (58%) were identified as deep learners. In regard to deep motive and deep strategy, the multivariate F was significant (Wilks’ Lambda F(2,47)=3.20, p=<.05), with univariate analyses revealing a significant main effect for deep strategy (F(1,48)=6.54, p<.05) but not for deep motive (F(1,48)=3.04, p>.05). In regard to deep approach and deep-achieving approach, the multivariate F was not significant (Wilks’ Lambda F(2,47)=2.81, p<.07) (although the results evidenced a trend towards significance, .07), with univariate analyses revealing a significant main effect for deep approach (F(1,48)=5.36, p<.05). These results, confirmed by examination of the means, indicated that the difference between the groups was due to an increase in deep strategy and deep motive scores for learning for the surface learners but only the difference for deep strategy was significant, and that the significant increase in deep approach to learning was by the surface learners.

Given the findings that deep-related approaches to learning increased in the non-traditional course and that students with higher surface approaches to learning scores at the beginning of the semester had, by the end of the semester, increased their deep strategy
scores relative to deep learners, a series of multiple regression analyses were conducted to investigate the relationship between TLA methodologies used in the non-traditional course and students' deep-related approaches to learning. However, none of the regressions showed significant results, indicating that none of the individual teaching and learning (field work task, field work supervision, learning group working experience, learning group contract, peer teaching sessions, lectures) or assessment (peer teaching session, applied essay, examination) components examined in this study were, on their own, predictive of deep motives, strategies or approaches to learning. These findings were interpreted as indicating that all students perceived all TLA methodologies in the non-traditional course to be equally effective in facilitating deep learning. This interpretation gained further support from finding, through post-hoc analysis, that none of the TLA methodologies differentiated between surface and deep learners.

In summary, results of the present study indicated that non-traditional teaching and learning methods, compared with traditional teaching and learning methods, resulted in an increase in deep motives, deep strategies and deep-related approaches to learning. Results also indicated a trend towards significance for surface learners, compared with deep learners, on deep approaches to learning and a significant increase by surface learners in deep strategies for learning. Results also indicated that there was no difference between the TLA methodologies in the non-traditional course in enhancing deeper learning.

Discussion

The current study compared non-traditional TLA methods with traditional TLA methods and their effect on students' approaches to learning. Results support the notion that action learning based non-traditional methods are more effective than traditional methods in enhancing deep learning. Significant increases were found in deep motives, deep strategies and deep-related approaches to learning in the non-traditional environment. This finding supports the conclusions of several researchers (e.g., Biggs & Rihn, 1984; Dart & Clarke, 1991; Newble & Clarke, 1986) that the way in which a student approaches their learning is dependent, in part, on the characteristics of the teaching to which they are exposed. It also supports Biggs' (1989, 2003) suggestion that the teaching and learning environment is a key factor in influencing approaches to learning, and Ramsden's (1992) proposition that deep and surface approaches are responses to the educational environment.

It is important to note that the present study controlled for a number of possible confounding variables that have been found to contribute to the shift in learning, for example faculty/department characteristics (Newble & Clarke, 1986), teacher effectiveness (Entwistle & Ramsden, 1983; Kember, 2000; Newble & Clarke, 1986), course effectiveness (Kember & Gow, 1989), perceived importance of the course content (Fransson, 1977), and workload (Dahlgren, 1984; Ramsden & Entwistle, 1981). It is also instructive to make comparisons with studies that had previously attempted to shift students towards deeper learning. For example, Biggs and Rihn (1984) found shifts in students' deep motives, deep strategies, achieving strategies, and deep approaches to learning using highly motivated "Stanford" students who had sought assistance in having their approach to learning changed. A similar study, by Dart and Clarke (1991), reported an increase, albeit not significant, in deep motives, deep strategies, and deep-related approaches to learning. However, they did not employ a control group. The fact that the present study controlled for a range of participant characteristics and presage factors by adopting a comparison group (by using the same participants studying in two different courses), and by using unbiased samples who are more representative of the student population than highly selected "Stanford" students, indicates that the shift in deep learning was not just a change over time but a shift due to the factors in the particular learning environment. Further, by controlling for several other environmental factors (teacher and course effectiveness and perceived importance of content), the present study concluded that the shift toward deeper learning was attributable to the specific TLA methodologies employed in the non-traditional course.
The current finding that students shifted toward deeper learning in one course, but not the other, lends support to Marton and Saljo’s (1976) concept of approach to learning as a strategy rather than a consistent style which is adopted across contexts. Further support came from the focus group data with 14 students commenting that “the Community Psychology course required an understanding of the concepts so we could relate them to the field work, but Psychological Assessment required learning a lot of facts”. It appears that these students recognised that different strategies were required for studying in the two courses.

The current study also found that surface learners, compared to deep learners, moved toward deeper approaches to learning, with a significant increase by surface learners in deep strategies for learning. This supports results from Dart and Clarke (1991) and Biggs and Rihn (1984) who, although not comparing surface with deep learners, found the highest increases to be in students' deep strategies for learning.

It is possible that the students in this study had little choice to do other than increase their deep strategies when presented with tasks which required their active involvement. For example, the field work project in Community Psychology required students to interview people from community and government agencies regarding the nature and underlying philosophy of their services offered, to apply concepts discussed in lectures to conceptualise the functioning of those agencies, to articulate personal reactions to their field work investigation and to integrate these experiences into a presentation to their peers. These tasks clearly required deep strategies and could not be completed simply by using surface strategies such as rote learning and memorisation. Indeed, comments made by students, who had been identified as surface learners, supported this proposition. Several focus group members stated that they "had no choice but to become involved in the topic"; and one participant commented that "because of the responsibility of the field work project, it forced you to care and have a passion and deeper interest in what you were doing. You did deeper level tasks than you'd usually do".

This finding provides empirical support for the theoretical proposition in the literature that establishing a deep context for learning will shift surface learners into deeper approaches (Gow & Kember, 1990). In addition, it provides support for the more specific proposition that action learning strategies via project work provides a specific methodology for shifting surface learners into deeper approaches (Henderson & Nathenson, 1984).

The current study found that none of the individual teaching and learning methodologies were predictive of deep-related approaches to learning. It is possible that none of the methodologies were associated with deep learning. However, given the findings of a shift in deep-related approaches between the non-traditional and traditional courses and a shift in deep strategy by surface learner, this is unlikely. It is more likely that, given the moderate to high effectiveness ratings for all six components, that all were perceived as equally effective in contributing to deep learning in the context of the non-traditional course.

One explanation for this finding could be provided by looking at the teaching and learning methodologies within the broader context of project-based learning. Project-based learning includes a wide range of learning experiences that aim to facilitate students in gaining an understanding of a topic or issue through involvement with real-life issues (Henderson & Nathenson, 1984). It is a comprehensive style of learning that integrates separate components of a course, not just a single component or a way of approaching a certain task. Hence, whilst it had been hypothesised that the experience of the field work task would be most strongly related to deep learning, the findings from the present study imply that the accompanying support and reflection components were also perceived as necessary contributors to the deep learning process.
The findings in this study support several researchers (e.g. Biggs, 1989, 2003; Kember & Gow, 1989; Ramsden, 1992) who suggested that deep approaches to learning can be increased by the establishment of a deep learning environment. In particular, the findings from this study indicate that non-traditional TLA methods increase deep learning relative to traditional TLA methods. Although it has been suggested in the literature (Kember & Gow, 1989) that it is a difficult task to influence surface learners toward deep-related approaches to learning, the present study has indicated that such a shift is possible through the use of appropriate TLA methodologies. The current study also supports the theory of Collier (1985) and Henderson and Nathenson (1984) that applied approaches such as action learning and project-based learning engage learners in an active way which leads them into deeper learning approaches.

Findings from the current study also have strong practical implications. Higher education might well consider the value of project-based learning in facilitating students' depth of understanding. Traditional schools, and traditionally designed courses within schools, could usefully consider making substantial changes to the TLA methodologies they employ. The sort of changes which might be possible, and would arguably enhance more effective learning include relevant project work, a reduction in didactic teaching in favour of interactive approaches, and a change of examination methods away from multiple-choice questions. However, reducing the use of methodologies that encourage surface learning is not sufficient to produce deeper learning (Trigwell & Prosser, 1991). Rather, it is necessary to introduce methodologies that are specifically aimed at enhancing deeper approaches to learning.

The present study has also indicated the need, in higher education, for the design of an integrative style of assessment which provides students with the opportunity to reflect on the project experience in order to link theoretical constructs with their practical action-based learning. The three assessment components of the applied essay, peer teaching session and an examination in the non-traditional course, provided students with integrative learning mechanisms involving them in opportunities for reflection, generalisation and application. These mechanisms, by providing students with opportunities for reflection, generalisation and application required them to link theoretical concepts with the practical experience of working in the field. The implication for practice in these findings is that assessment linked to reflection on practice is associated with deep-related approaches to learning.

The current study found a significant shift in deep-related approaches to learning over a single semester. It is likely that the practical significance of these results could be increased by measuring changes in students' approaches to learning between traditional and non-traditional courses over a year or an entire degree program. Such findings may well demonstrate substantial increases in deep-related approaches to learning and thus offer stronger support for modifications of traditional teaching and learning methodologies.

References


