

FLEXIBILITY AND LEARNING IN NURSE EDUCATION

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Paper presented at the AARE Conference, Sydney University
November 1990

INTRODUCTION

The notion of an approach to learning is well documented in the literature (Entwistle & Ramsden, 1983; Biggs, 1987a), and refers to a learner's relative predispositions towards surface, deep and achieving approaches to learning (Biggs, 1987b). There is also a strong supporting literature suggesting that use of these approaches may have differential effects on learning outcomes (Biggs, 1979, Cantwell & Biggs, 1988; Moore & Telfer, 1990). An approach represents an amalgam of related motivational and strategic states. A deep approach, for example, indicates a bias towards learning as an end in itself, and is associated with a desire to approach tasks with a view to maximising the level of understanding. Strategically, this approach implies the use of a variety of processing strategies aimed at clarifying and integrating meanings across many levels of abstraction (Kirby, 1988; Cantwell & Biggs, 1988). Not surprisingly then, a deep approach is conventionally associated with more complex and more abstract learning outcomes (Marton & Saljo, 1976; Biggs, 1979; Moore & Telfer, 1990; Cantwell, 1990). A surface approach, by contrast, indicates a bias toward learning as a means of attaining of some extrinsic goal: the process of learning itself is not intrinsically valued. The depth and breadth of learning undertaken by those utilising a surface approach is defined by a cost-benefit analysis of the expected learning product. Operationally, this is associated with a focus on the avoidance of failure rather than on mastery learning (Ames & Archer, 1988; Biggs, 1987a). Strategically, learning is likely to revolve around the rote learning of discrete units of information. It is again not surprising to find the literature associating a surface approach with less complex learning outcomes.

Both the deep and surface approaches represent intentional states for dealing with content-to-be-learned. Use of a deep approach represents a more complex learning style in the sense used by Kirby (1988) than is the case of a surface approach. It implies a greater breadth and depth in both content analysis and in strategic repertoire. Both approaches may also be associated with learning pathologies based on attentional factors. For a deep learner, the desire to extend and clarify meaning may, under certain circumstances, lead to a failure to buttress ideational learning with lower level elaboration (viz. Reder, 1980). Entwistle and Ramsden (1983) describe such learning as "globetrotting". For a surface learner, the desire to

reproduce target content may lead to undue focus at the lower levels of meaning, neglecting the need to integrate content at higher levels (viz. Kirby & Cantwell, 1985). Entwistle and Ramsden (1983) characterise this kind of pathology as "improvidence". It may well be the case that these pathologies are associated with an inability or unwillingness to competently manage data beyond a focal level of analysis. It may also be the case that the concurrent use of an achieving approach, with its focus on maximising learning performance through the imposition of organisation and structure on learning, may act to minimise the occurrence of these pathologies. Learners sensitive to the need to structure and organise their learning may well be more likely to impose a hierarchical structure on content being learned. This would reflect a more efficient mode of content management.

The notion of an executive strategy control mechanism influencing the kinds of procedural analyses undertaken by learners provides an important analogue to the approaches to learning paradigm. Proficient content learning has been assumed to involve the construction of complex hierarchical representations of the content being learned. For each level of content analysis, it is assumed that unique sets of processing operations come into play. In other words, the greater the complexity of the content being dealt with, the greater the complexity of the strategic repertoire being utilised. The capacity to manage complex strategic requirements in a manner congruent with complex content analysis may then be taken as an index of the efficiency of the executive strategy control mechanism.

The concept of executive strategy control has been operationalised through a Strategic Flexibility Questionnaire (SFQ) (Cantwell, 1990) which purports to measure learner predispositions towards what may be termed Adaptive strategic behaviours, Algorithmic strategic behaviours and Ambivalent strategic behaviours. Strategic Adaptiveness refers to a learner's predisposition toward both planning and monitoring strategic behaviours prior to engaging in content analysis and in situ. Such adaptiveness implies a willingness to construct and maintain some kind of strategy-task congruence. Previous research has indicated that strategic adaptiveness is positively related to complex learning, and, logically, to the use of both a deep and a deep-achieving approach to content management (Cantwell, 1990). The use of Strategy Algorithms indicates a predisposition towards some kind of fixed strategic algorithm across all learning tasks, regardless of the nature of the content to be learned. The predisposition indicates a clear disinclination towards flexibility in either the planning or monitoring of strategic behaviours. Given the narrowness and shallowness of the surface perspective on content management, it is not surprising that the algorithmic approach to strategy use has a strong association with a surface approach to learning, and a negative relationship with complex learning (Cantwell, 1990). Strategic Ambivalence indicates a loss of strategic control over processing, or a high degree of uncertainty and confusion in implementing strategic decisions. Learners scoring highly on this scale are unlikely to establish congruence between content management

and procedural analysis. Previous research points to a positive relationship between ambivalence and the use of strategy algorithms, a negative relationship between ambivalence and learning outcomes at all levels of complexity, and a positive relationship between ambivalence and a surface approach to learning (Cantwell, 1990).

Taken as a whole, the two sets of scales provide for complementary perspectives on executive decision-making in learning. The SPQ scales intimate a perspective over content, indicating the adoption of certain strategic behaviours to ensure congruence between intent and management of content. The SFQ scales are presumed to operationalize such management decisions by focusing on the procedural analyses undertaken by learners in determining when and how changes in strategic behaviour are perceived necessary and undertaken.

The data being reported in the current paper represents a sample from a broader study examining the impact of approaches to learning and executive strategy control on the learning outcomes of student nurses in theoretical and applied settings. The two sets of scales will be examined in relation to basic knowledge tests in two areas of nurse theory, and in relation to subject performance on a clinical reasoning task. The latter will be reported by case study only.

METHODOLOGY

Subjects

Subjects for the study drew from a pool of 235 third-year Diploma of Health Science (Nursing) students at the University of Newcastle. The subject pool included 37 males and 198 females. Subjects ages ranged from 19 to 48 years, with a mean of 22.8 years (S.D. 5.46).

Materials

1. Both the SPQ and SFQ have been described in full in previous reports (Cantwell, 1990).
2. Knowledge-base: As an index of subjects knowledge-base in both general and mental health nursing, performance scores for end of package tests in both Homeostasis and Disturbance were analyzed. The Disturbance test was a 30 item multiple choice test, requiring essentially detail level information, and without any scope for interpretative analysis. The Homeostasis test was based on a case study format. Subjects had been given a detailed case history and were required to provide short answer responses to questions relating to case data. The questions varied in difficulty from short definitions to two or three line interpretations of clinical data. Subjects were required to complete a number of nursing diagnoses and care plans. At no stage were subjects asked for extended responses.

3. Clinical Simulation: Subjects were provided with an 8 page booklet. Page 1 provided a brief nursing scenario relating to a pre-operative interview of a male patient about to undertake a minor surgical procedure. Pages 2 and 3 contained questions relating to subjects' planning for the interview, strategies for conducting the interview and strategies for the evaluation of the interview. A short video of an interview based on this scenario was provided, with two pages made available for note-taking. The remainder of the booklet required subjects to complete a Mental Status Assessment of the client; to provide four nursing diagnoses listed in priority order (based on a NANDA list provided to subjects); to provide, with justification, a primary or major nursing diagnosis; and to provide, with justification, a short-term nursing intervention strategy. Expert opinion (Lecturing staff in the Department of Nursing) was consulted to ensure that the scenario and subsequent exercises represented a realistic simulation of clinical procedures and reasoning.

Procedures

The SPQ and SFQ forms were completed by all subjects in the second week of the first semester. These were completed in normal class time. Knowledge tests for both Homeostasis and Disturbance were conducted by the Department of Nursing Studies. Results were subsequently made available by the Department. The clinical simulation was conducted during normal classroom time by the researcher. Space prevents a detailed description of the procedures for the whole simulation. The data relating to the nursing diagnoses were gathered following the viewing of the interview video and completion of a Mental Status Assessment.

RESULTS

Knowledge-base

Subject knowledge-base in mental health and general nursing were assessed through an end of package test. Full descriptive statistics relating to the test, item analysis and reliability data are not available at the time of writing. Data from both tests were subjected to correlational analysis with subject performance on the SPQ and SFQ scales (CSS/PC, Statsoft, 1988).

For both the disturbance test and the homeostasis test, significant negative associations between test performance and a surface approach and between test performance and strategic ambivalence were apparent. No other correlations approached significance. A summary of the correlations is presented in Table 1. Further analysis of both tests is currently being undertaken.

Clinical Simulation: Case Studies of Diagnostic Reasoning

Four prototypical cases were selected for analysis of responses to the

diagnostic reasoning component of the simulation. Subjects had been asked to identify the primary or major nursing diagnosis for the patient observed in the video, and to provide a detailed rationale for this selection. Each response was propositionally analyzed (Kirby & Cantwell, 1985) for the presence of supportive data from the interview (diagnostic information)

	Disturbance Test (n=212)	Homeostasis Test (n=216)
Surface Approach	-.16*	-.13#
Deep Approach	.04	.04
Achieving Approach	.04	.06
Adaptive	-.04	-.05
Ambivalent	-.15*	-.13#
Algorithmic	-.01	-.08

p = .05
 * p < .05

Table 1: Relationship between SPQ scales, SFQ scales, and performance on Disturbance and Homeostasis package tests.

and for the presence of information pertaining to nursing management that could be reasonably generated from the case data (elaborated information). Copies of protocols and illustrative propositional diagrams may be obtained from the first author on request.

Four cases, representing "Deep-Adaptive", "Deep-Ambivalent", "Surface-Adaptive" and "Surface-Ambivalent" learning profiles, were used for the analysis. For reasons of time and space, profiles relating to Algorithmic strategy use have not been included.

On the basis of evidence available in existing research (e.g. Cantwell & Biggs, 1988, Moore & Telfer, 1990), it was expected that a deep approach should be associated with both more complex and more abstract learning outcomes. Complexity in this sense refers to the level of information utilised: primarily lower-level ideas or details vs. higher-level ideas or categories. Abstraction refers to the kinds of inferences or elaborations generated about the data used.

The responses of both Deep subjects were consistent with existing research. Both subjects included not only diagnostic or given information, but also elaborated on this information to include reasoning underlying subsequent nursing interventions. However, when analyzed in relation to the strategic flexibility measures, differences were apparent. In the case of Subject A (Deep-Adaptive), three dimensions of strategic adaptiveness are apparent: the diagnostic data is clearly categorised, the systemic implications of the diagnosis are coherently related in terms of both the patient and in terms of subsequent management decisions, and the subject is aware that the knowledge-base underlying this reasoning process also involves non-case-specific research. By contrast, Subject B (Deep-Ambivalent), while able to organise and categorise the diagnostic information, is less able to elaborate the systemic implications beyond those immediately apparent for the patient's specific condition.

Also consistent with previous research, the responses of the two Surface learners were generally less complex than the responses of the Deep subjects, and were clearly less abstract. Both surface learners were constrained in their responses to the immediate interview data at hand. Neither subject attempted to elaborate beyond the immediate diagnostic information. In the case of Subject C (Surface-Adaptive), however, there was an apparent attempt to categorise the diagnostic information. Unlike Subject D (Surface-Ambivalent), Subject C distinguished between the general anxiety state experienced by the family as a consequence of the wife's drinking, and the specific anxiety state induced by the patient's hospitalization. Subject D, by contrast, restricted the response to data pertinent to hospitalisation only.

The case data yield two major conclusions. A deep approach to learning tends to associate with both greater complexity in the kind of categories of diagnostic information used, and with a greater degree of abstraction in the kinds of elaborations generated from the diagnostic data. This is consistent with existing research. This conclusion, however, appears to be qualified by the strength of the executive strategy control mechanism. For surface subjects, a predisposition towards strategic adaptiveness appears to yield more complex, if not more abstract, diagnoses. For deep subjects, the predisposition appears to yield more abstract, if not more complex, diagnoses.

DISCUSSION

Within the limitations of a work-in-progress report, the results of the study appear to have important theoretical implications and important implications for instruction and assessment in nurse education. Theoretically, it would appear that the interaction between approaches to learning and executive strategy control is differential. There appears to be a crossover effect for strategic flexibility: for a given perspective on content, flexibility appears to enable the construction of more coherent and organised hierarchical structures. However, executive control alone

does not appear to impact upon the perspective taken: it appears to primarily impact on the degree to which the data is managed within the constraints of that perspective.

There also appears to be an interaction between approach to learning, executive control and task difficulty. On the less complex knowledge tests, only a surface approach and ambivalent strategy control damaged performance. On the more complex problem-solving task, surface-ambivalence was similarly damaging, but deep-adaptiveness was clearly associated with a more successful learning outcome. This may well have important implications for both instruction and assessment in nurse education. It would seem important in the implementation of a problem-based nurse-education curriculum that educators be aware of both the perspective the learner takes in addressing the content (approach), and the degree to which the learner is able to operationalise this perspective (executive control).

REFERENCES

- Ames, C. & Archer, J. (1988). Achievement goals in the classroom: Student learning strategies and motivational processes. *Journal of Educational Psychology*, 80, 260-267.
- Biggs, J. (1987a). *Student Approaches to Learning and Studying*. Hawthorn: Acer.
- Biggs, J. (1987b). *Study process Questionnaire*. Hawthorn: ACER.
- Cantwell, R. (1990). Flexibility and learning. Paper presented at the HERDSA Conference, Brisbane, July 1990.
- Cantwell, R. & Biggs, J. (1988). Effects of bilingualism and approaches to learning on the writing and recall of expository text. In Gruneberg, M., Morris, P. and Sykes, R. (eds), *Practical Aspects of Memory: Volume 2 - Clinical and Educational Implications*, London: Wiley.
- CSS/PC, v2.1, (1988) Statsoft
- Entwistle, N. & Ramsden, P. (1983). *Understanding Human Learning*. London: Croom Helm.
- Kirby, J. (1988). Style, strategy and skill in reading. In Schmeck, R. (ed), *Learning Styles and Learning Strategies*. New York: Plenum Press.
- Kirby, J. & Cantwell, R. (1985). Use of advance organisers to facilitate higher-level comprehension. *Human Learning*, 4, 159-168.
- Marton, F. and Saljo, R. (1976). On qualitative differences in learning: Outcome and process. *British Journal of Educational Psychology*. 46, 4-11.
- Moore, P. & Telfer, R. (1990). Pilot Learning Styles. Paper presented at the Australian Psychological Society Conference, Melbourne, September, 1990.
- Reder, L. (1980). The role of elaborations in the comprehension and retention of prose. *Review of Educational Research*, 50, 5-53.