"I Only Wish I Had Known It Sooner." Education Students' Changing Conceptions of Learning Strategies.

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Introduction

ABSTRACT

One of the cornerstones of student learning is the ability to use appropriate learning strategies. Awareness and orchestration of learning strategies are central to self-regulation of learning. Effective learners have a range of strategies and use them appropriately for different tasks. Effective learners are flexible and can adapt their strategy use to achieve their learning goals. If we expect prospective teachers to help their students become effective learners, they themselves need to be aware of and manage their own learning. But are our prospective teachers themselves effective learners in terms of strategy use?

Using a qualitative approach, we examined the learning strategies of undergraduate and graduate Education students from a private and a public university. At the beginning and end of semester, as an integral part of a unit of study, students were asked to report on their learning strategies related to the learning task and to themselves as learners. Results are discussed in terms of the range and diversity of reported learning strategies, and students' self-awareness regarding their own learning. Changes over the semester are also discussed. Implications for teacher education programs, for the development of university curricula in general and for staff development are considered, with the view of improving the quality of teaching and learning.

There is extensive literature which links the use of effective learning strategies with high academic achievement (Archer, 1998; Fuller, Chalmers, & Kirkpatrick, 1994; Hattie, Biggs, & Purdie, 1996; Janssen, 1996; Pintrich & Johnson, 1990; Tate & Entwistle, 1996; Thomas, 1988; Zimmerman, 1998; Zimmerman, Greenberg, & Weinstein, 1994).

Effective learners can be characterised as self-regulated learners. They have clear, personally meaningful goals for learning which stress learning for understanding, they know and appropriately use a wide repertoire of learning strategies, and they use metacognitive strategies to manage learning tasks. They also have metacognitive knowledge of learning and conceptualise learning in qualitative terms, believing themselves to be capable of learning and responsible for their own learning (Zimmerman, 1994).

Learning strategies include cognitive strategies such as basic and complex rehearsal, elaboration and organisation strategies (Weinstein, 1982; Weinstein & Underwood, 1985) which are ordered in increasing depth of processing (Radloff, 1997). Learning strategies also include adaptive strategies such time-management and organising the learning environment, cue-seeking, help-seeking and volitional strategies such as persistence in the face of obstacles to learning (see Table 1). Metacognitive strategies include planning,

monitoring, adapting and evaluating learning and learning outcomes.

These strategies are important in effective learning across all disciplines. As future teachers, Education students, in particular, need to have effective learning and metacognitive strategies (de la Harpe & Radloff, in press). If teachers do not know how to learn effectively and cannot themselves do so, how can they hope to help their own students to be effective learners? As Jones, Slate and Kyle point out, teachers "who do not have these skills lack both the ability to function as lifelong learners and to develop the academic skills of their own students" (1992, p. 14). Moreover, future teachers need metacognitive strategies in order to engage in reflective practice and continuing professional development as part of lifelong learning (Radloff, 1997). It is, therefore, especially important that, as part of their university study, Education students develop an understanding of effective learning and use appropriate learning and metacognitive strategies in their own learning. According to Anderson and his colleagues (Anderson, Blumenfeld, Pintrich, Clark, Marx, & Peterson, 1995), helping future teachers in this epistemological development is part of the job of teacher educators.

Yet, studies which have looked at the learning approaches and learning strategies of Education students suggest that students enrolled in pre-service and in-service programs may have limited understanding and use of learning strategies and show poorly developed metacognitive awareness and use of metacognitive strategies (Radloff, 1997).

Jones, Slate and Kyle (1992) surveyed 115 secondary Education students using a Study Habits Inventory and found that students in the lower quartile in terms of course grades differed significantly from students in the upper quartile in terms of poor time management including procrastination, inappropriate study techniques including being less likely to review and to engage in

comprehension monitoring, and being less likely to seek lecturers' help when having difficulties. They concluded that Education students would benefit from a program to improve their learning skills.

A study by Alderman et al. (Alderman, Klein, Seeley, & Sanders, 1993) of 44 pre-service Education students used data from weekly learning logs. Students described and reflected on their learning strategies, and it was found that more successful students reported using a greater number of learning strategies and that few students reported planning, monitoring and adapting their learning strategies. Based on their findings, the authors concluded that all students could benefit from instruction in learning strategy use.

In a study by Boulton-Lewis and her colleagues (Boulton-Lewis, Wilss, & Mutch, 1996) of 40 experienced teachers enrolled in an in-service Bachelor of Education course, students were asked to write about a page on 'Your beliefs about learning'. They were to include a description of what they knew about their own learning, how they went about learning, what factors influenced their learning and the criteria they used to determine that they had learnt something, their view of learning and their beliefs about how they acquired their view. Analyses of student responses showed that most of the adult learners were not very knowledgeable about learning, did not perceive themselves as responsible for their own learning and had unsophisticated conceptions of learning .

A study by Radloff (in press) of 23 adult learners enrolled in a pre-service Education program found, based on semi-structured interview responses, that at the beginning of their course, most students reported using predominantly rehearsal strategies when learning, and held quantitative views of learning. Only about half reported using metacognitive strategies such as planning, monitoring and adapting their learning (see Table 1 for a brief description of strategies listed here and elsewhere). After two years

of study, there were changes in the use of learning strategies, with a marked drop in the use of basic rehearsal strategies and an increase in the use of organisation strategies (both basic and complex), and in cue-seeking but students still held predominantly quantitative views of learning. There were no major changes in the reported use of metacognitive strategies with still only around half of the participants reporting using these strategies to manage their study.

There are a number of reasons why learners may not use appropriate learning strategies apart from not knowing what strategies to use or how to use them. First, the learning tasks students are required to complete and the assessments used to measure learning may not be cognitively demanding enough to warrant the use of other than basic learning strategies such as memorising (Garner, 1990). Second, with the typically overstuffed curricula and emphasis on content over process in much university teaching (Fox & Radloff, 1997; Shuell, 1990), there may not be enough time or opportunity for students to develop and use effective learning strategies.

We were interested to find out the extent of Education students' knowledge of learning and metacognitive strategies and their use of these over a semester of study to manage the learning task and themselves as learners. Specifically, we wanted to know how students conceptualised the learning demands of their course at the beginning of the course, what strategies they believed they would have to use to meet these demands, and what strategies they reported having used at the end of the semester. Both the courses in which the students were enrolled had theories of learning as the unit content and, as an integral part of the unit, modelled, encouraged and provided examples of effective learning and metacognitive strategies and how to use them. Time and opportunity were provided for students to reflect on their learning process including strategy use.

Methodology

The study employed a naturalistic approach to examine reported strategy use at the beginning and end of a semester of study, for two groups of participants at two universities in Western Australia.

Participants

A total of 67 students at one private and one public university (D and M) participated in the study. Students at the private university were enrolled in the second year of a pre-service three year Education program (*n*=35). This group comprised all the second year students in this program and because they did many common units, they all knew each other quite well. Students in the public university were enrolled in a one year Diploma of Education program (*n*=32) and came from a variety of discipline backgrounds and had not necessarily studied with anyone else in the group before this first semester unit. A few students had taken previous psychology units, but for the large majority this was their introduction to educational psychology. Most students from both universities were young female adults. Because all students applied for and were accepted into teacher education programs, we are assuming that there would be no great differences between the two groups in terms of academic ability and learning goals.

Procedure

Both groups of students were completing one semester units in educational psychology in which there was an explicit focus on self-regulation of learning, one major aspect of which was the use of learning strategies. One component of assessment was a case study in which students completed open-ended questions about their learning at two points in the semester, and then wrote a reflective report on themselves as learners. As part of these questions, at the beginning of the semester, students were asked to list the task, self, and environment strategies they intended using

during the unit, and at the end of the semester, they were asked what strategies they had used. They were also asked to comment on any perceived constraints on their learning.

Student responses were coded and analysed using as a basis a coding scheme derived from the literature on self-regulation of learning (Radloff, 1997). The coding categories which are shown in Table 1 consisted of three types of strategies – task (related to cognitive aspects of learning), self (related to volitional aspects of learning), and environment (related to the context of learning). Coding was carried out independently by two of the researchers, with about 50% of coding verified by another researcher.

Comments made by students as part of the case studies they wrote about their own learning in the units were also examined in order to provide information about students' awareness of and views on their learning strategies and the impact of these on their learning. These case studies formed part of the assessment component of the units so students were required to engage in self-reflection. They were told, however, that they would not be assessed on what strategies they may or may not have used, but on how well they explained why they used the strategies they did, and how this impacted on their learning.

Table 1. Task, self and environment strategies: categories and descriptions

Focus	Categories	Description
Task	Rehearsal	
	Basic	Repeating items to be learned, rereading text or notes, mnemonics
	Complex	Copying, underlining, highlighting appropriate to learning task
	Elaboration	
	Basic	Forming mental image or sentence relating one item to another
	Complex	Paraphrasing, summarising, making analogies, describing how new knowledge can be used, recounting, analysing, brainstorming
	Organisation	
	Basic	Grouping, ordering material, breaking into steps, sections
	Complex	Outlining a passage, creating a hierarchy, selecting relevant material
	Activities	Completing assignments, attending classes, doing class activities
Self	Maintaining health	Maintaining health through activities such as exercise, relaxation, eating and sleeping well
	Time management	Organising time for study, learning
	Volitional strategies	
	Attending	Maintaining attention in the face of distractions, staying focused
	Persisting	Persisting, 'slogging' away, putting in consistent effort
	Self-reinforcing	Reinforcing self when learning goals achieved, going over what has been achieved, reinforcing goals
	Managing affect	Dealing with negative feelings, such as anxiety, through self-talk
	Meeting deadlines	Meeting deadlines, getting the assignment done
	Cramming	Doing things at the last minute, procrastinating
	Setting goals	Setting short-term goals
Environment	Using environment	

Space	Having, using or organising a study space	
Peer support	Having, using peer support (eg for morale, for time management)	
Teacher support	Having, using teacher support (eg for morale, negotiating task time)	
Adaptive strategies		
Help-seeking (teacher)	Asking for help from a teacher/tutor, asking questions	
Help-seeking (peers)	Asking for help from another student/working collaboratively in a study group	
Help-seeking (others)	Asking for help from others, e.g. former students, family members	
Cue-seeking	Seeking for cues as to what to do or what is expected	
Resources	Using resources e.g. library, computers	
Metacognitive strategies		
Planning	Planning study schedules, study strategies	
Monitoring	Monitoring progress and understanding	
Evaluating	Evaluating self and learning	
Reflections	Comments on learning, comparing past and present	
Intentions	Comments on intentions and whether fulfilled	

Results and Discussion
Strategy use
The frequencies of occurrence of each of the learning strategies for each group alone and the two groups together at the beginning (M1, D1) and end (M2, D2) of semester are shown in Table 2.

Table 2. Frequencies of occurrence of task, self and environment strategies for students at universities M (*n*=32) and D (*n*=35) alone and together at the beginning (M1, D1) and end (M2, D2) of the semester

Focus	Categories	M1	M2	D1	D2	Total1	Total2
Task	Rehearsal						
	Basic	10	8	0	6	10	14
	Complex	12	8	12	8	24	6
	Elaboration						
	Basic	0	0	5	3	5	3
	Complex	18	25	32	31	50	61
	Organisation						
	Basic	0	2	0	0	0	2
	Complex	1	0	1	1	2	1
	Activities	47	40	39	43	86	83
Self	Maintaining health	7	5	7	10	14	15
	Time management	21	13	15	11	36	24
	Volitional strategies						

	Attending	3	1	5	2	8	3
	Persisting	4	1	0	1	4	2
	Self-reinforcing	1	0	3	8	4	8
	Managing affect	3	0	1	3	4	3
	Cramming	1	0	0	1	1	1
	Meeting deadlines	5	4	3	3	8	7
	Setting goals	1	0	7	10	8	10
Environment	Using environment						
	Space	4	2	2	2	6	4
	Peer support	1	3	1	0	2	3
	Teacher support	0	1	0	0	0	1
	Organise material	1	1	5	0	6	1
	Adaptive strategies						
	Help-seeking (teacher)	7	3	4	4	11	7
	Help-seeking (peers)	4	5	16	7	20	12
	Cue-seeking	1	2	0	0	1	2
	Resources	6	5	3	5	9	10
Metacognitive strategies							
	Planning	13	6	5	7	18	13
	Monitoring	1	0	0	0	1	0
	Evaluating	7	7	8	11	15	18
	Intentions	0	4	0	1	0	5

Overall, students reported using a variety of strategies to manage their learning tasks, themselves and their learning environment, as well as some metacognitive strategies, although they were not specifically asked about the latter. However, most strategies were not mentioned very frequently

In terms of task strategies, the most frequently mentioned strategy related to completing activities such as attending lectures and doing assignments, followed by complex elaboration consisting mainly of note-taking. Basic and complex rehearsal

strategies were the next most frequently mentioned task strategies.

In terms of self strategies, time management predominated, followed by maintaining health. Strategies to manage the environment were not mentioned very frequently. In terms of metacognitive strategies, planning and evaluating were most often mentioned.

The greatest changes over the semester in task strategies were an increase in complex elaboration and a decrease in complex rehearsal. Reported use of the self strategy of time management decreased at the end of the semester. This change was more marked for students from M than those from D. The adaptive strategies of help-seeking from both teachers (M) and peers (D) decreased over the semester. Students from M, who did not know one another at the beginning of semester, initially reported more help-seeking from teachers, whereas students from D, who did know one another, reported more help-seeking from peers. The metacognitive strategy of planning decreased over the semester, mainly due to responses from the M group.

Higher-order strategies, such as basic or complex organisation, were seldom mentioned on either occasion. Rather, there was a strong emphasis at both the beginning and the end of the semester on lower-order cognitive strategies such as reading, highlighting, and reviewing. In terms of metacognitive strategies, planning was limited to study schedules and there was only one mention of monitoring learning.

In general, students appeared to have difficulty in distinguishing between strategies to manage the task and strategies to manage themselves as learners, and many tended to regard activities such as completing assignments as strategies in themselves. Students used a range of strategies, but for many, the range was fairly limited and mostly reflected task directed strategies, rather than those directed at management of oneself as a learner. This finding is consistent with previous research regarding Education students' understanding, use and awareness of learning strategies (Alderman et al., 1993; Boulton-Lewis et al., 1996; Radloff, in press). There was also little change in the frequency or type of strategies used over time.

There was little evidence of reflection on strategy use; most responses appeared quite superficial and routine, although some students reported increased awareness of strategies and their learning processes in general. In particular, there was virtually no mention of monitoring, suggesting either that students did not do this, or did not perceive it as a strategy. This was particularly surprising in regard to the M students who were in their fourth year of tertiary study and therefore, might be expected to be more aware of and reflective about their learning. It is possible that the intensive nature of their course mitigated against opportunities for reflection.

The use of particular strategies appeared to decrease by the end of the semester – this may have been due to the strategies no longer being perceived as important (for example, time management and planning, and completing assignments). It may be that different strategies are more or less important and useful at different stages during a semester of study. If this is the case, then both teachers and students could be made aware of which to emphasise depending on the changing demands of study. Something akin to this is suggested in the study by Tynjälä (1997) who found domain-specific strategies to be more relevant when addressing new material, and more metacognitive strategies more appropriate later in a course of study.

Impact of focusing on strategy use

Most students reported greater awareness of their use of study strategies by the end of semester. Two factors seem to have led to these changes: the process-oriented focus of the unit – that is, learning about learning strategies and self-regulation – and the requirement to reflect upon themselves as learners. As Schunk and Zimmerman (1996) suggest, encouraging students to engage in self-regulatory processes such as self-observation and self-evaluation can enhance their self-efficacy and intrinsic motivation and so promote self-regulatory behaviours such as the use of appropriate learning strategies. Discussion in the following section is based on comments from students' written case studies that illustrate the impact the focus of this unit had.

Some students appreciated the opportunity to learn new strategies and to have an increased range of strategies from which to select those most appropriate to the situation. Others felt no changes were either likely or necessary. The requirement to reflect on themselves as learners was obviously a new experience for many students, and this alone seems to have made an impact. Even if their actual strategy use did not change significantly, they were now aware that a number of factors might affect their use of different strategies, that some strategies were more effective than others, and that some strategies were more

appropriate than others in certain situations. The following quotes illustrate some of these points:

This assignment more specifically has made me focus on my habits and problems as a student. In itself it has provided motivation to me to change my study habits for the better. D6

I have never looked at the things in my life which affect my learning. I have discovered that there are many constraints on my learning which I need to look at and change. D35

I feel that my experiences in this unit will have only a little impact on my future learning. I now know that throughout recent years of mature-age studies I have already used many of the strategies discussed, only before now I hadn't realised that they were actual formal strategies. They were just things that I did to make my learning progress as effectively as possible. D10

At this stage, I believe I am fairly set in my learning strategies. They have worked for me so far, so there was really no great need to change them. D19

It pointed out many learning habits I possess and did not realise had. It has also helped me understand why I have problems with a lot of the assessment work involved with school and university. M01

I have become a metacognitive learner... Once reflecting on the data obtained, I am now able to change or modify my learning strategies in order to achieve my learning goals. M02

...has actually helped me understand myself as a learner. Through this assignment I am now living proof that a learner will benefit from it. I now have an understanding of myself that I have not had previously. M07

I have really valued this report it has made me analyse my learning and education in a way that a questionnaire just cannot do. I have learnt things about myself at which I would never have looked twice. Motivation and learning go hand in hand without one the other does not succeed. I have learnt this after three and a half long years at University. I only wish I had known it sooner. D11

When I was using a surface approach early in the semester, constantly 'flicking' from one subject to another, my concentration levels were down, my morale was low and I felt I wasn't 'getting anywhere'. I soon realised I had to change my approach. After changing to a deep approach, enthusiasm reappeared together with a sense of achievement. M04

Constraints

Some students reported not using perhaps more effective intended strategies because of university and personal constraints. This finding is consistent with those of Garner(1990) and Shuell (1990). Table 3 shows the frequency and percentages of mention of constraints on learning, the major ones being work and family commitments. Students appear to perceive these two constraints as external and unavoidable.

Table 3. Frequency and percentages (in brackets) of mention of perceived constraints on learning for students at M (*n*=32) and D (*n*=35) at the beginning (M1, D1) and end (M2, D2) of the semester

	M1	M2	D1	D2	Total 1	Total 2

Type						(M1+D1)	(M2+D2)
Time	family	15 (46.9)	16 (50)	15 (42.9)	15 (42.9)	30 (46.9)	31 (44.3)
	work	16 (50)	14 (43.8)	21 (60)	23 (65.7)	37 (57.8)	37 (52.9)
	social	5 (15.6)	2 (6.3)	8 (22.9)	7 (20)	13 (20.3)	9 (12.9)
	housework	4 (12.5)	2 (6.3)	2 (5.7)	2 (5.7)	6 (9.4)	4 (5.7)
	distance	0 (0.0)	1 (3.1)	3 (8.6)	3 (8.6)	3 (4.7)	4 (5.7)
Sub-total		40	35	49	50	89	85
Resources	finance	11 (34.4)	6 (18.8)	3 (8.6)	3 (8.6)	14 (21.9)	9 (12.9)
	transport	1 (3.1)	0 (0.0)	1 (2.9)	4 (11.4)	2 (3.1)	4 (5.7)
	lack of computer	0 (0.0)	1 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.4)
Sub-total		12	7	4	7	16	14
Self	motivation	2 (6.3)	2 (6.3)	1 (2.9)	1 (2.9)	3 (4.7)	3 (4.3)
	stress/guilt	1 (3.1)	2 (6.3)	2 (5.7)	1 (2.9)	3 (4.7)	3 (4.3)
	laziness	1 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.6)	0 (0.0)
	family support	1 (3.1)	0 (0.0)	2 (5.7)	2 (5.7)	3 (4.7)	2 (2.9)
	memory	4 (12.5)	2 (6.3)	1 (2.9)	1 (2.9)	5 (7.8)	3 (4.3)
	age	2 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.1)	0 (0.0)
	time since last study	2 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.1)	0 (0.0)
	language	1 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.6)	0 (0.0)
	sleep	0 (0.0)	2 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (2.9)
	health	2 (6.3)	2 (6.3)	0 (0.0)	3 (8.6)	2 (3.1)	5 (7.1)
	disability	1 (3.1)	1 (3.1)	0 (0.0)	0 (0.0)	1 (1.6)	1 (1.4)
Sub-total		17	11	6	8	23	17
Study	Workload	4 (12.5)	5 (15.6)	1 (2.9)	2 (5.7)	5 (7.8)	7 (10)

Many reported their study strategies would be different were it not for these constraints. Some regarded themselves as 'getting by', using quick and easy methods of learning to fulfil requirements in the time they had available – sometimes regretfully. A number of students saw these constraints as preventing them from being 'deep' learners, as the following quotes illustrate:

The monitoring/regulating strategy I didn't use simply because I ran out of time and was unable to assess whether or not the pace of work I was completing was appropriate. Most of the time during this unit I have felt like I was running out of time so I never stopped to see if I was moving

fast enough, I just assumed I would not be running on time. M05

My own strategies towards learning in this unit changed from being able to put all my

strategies into action as to how I wanted to approach learning in this unit with, by week 8, having to modify these strategies (due to time constraints) to being concerned with just 'keeping up'. M06

The environment at home was not suitable as there were many distractions such as outside noise (roadwork construction), and inside noise (television, visitors, musicians practising, and telephone calls). I attempted to study at the university library but I was all too happy and welcoming when peers came every fifteen minutes to chat. The rate of learning became slower as the semester progressed. D2

Future use

Some students reported that the experiences of learning about new strategies and reflecting on themselves as learners would change their way of learning in the future, and would make them more aware of these issues in their role as future teachers:

Also as a student teacher I hope to pass on my experiences of learning to the children and hopefully I will be able to introduce them to different learning and motivational strategies that will be useful to them in their studies and life. D 7

[The assignment] has also highlighted the worth of having my own students reflecting and defining the goals and strategies of their own learning in an effort to make improvements or simply to reinforce what they would normally do. D 21

...has been very valuable in helping me understand theoretically the processes of learning and its practicality in my learning. It has also helped me to be more conscious of my learning process in my other units and to understand others' learning process. M03

I will be more inclined in the future to make sure I develop strategies for dealing with a particular task. I think I will be less likely to just 'jump headlong' into a task without any particular direction, as the result is likely to be that I will just surface learn....I came to understand that learning requires the active participation of the student in the instructional process also. M05

Limitations of the study

This study is based on students' self reports of their strategy use. No direct observations of their learning were made. Research has pointed to the advantages and disadvantages of relying on self-reports (see for example Galbo & Mayer Demetrulias, 1996). The data sheets contained a number of questions relating to factors affecting learning such as goals, expected outcomes, personal constraints etc. Only those students who responded to the section on strategies are include in this sample, and the scope of this study does not allow exploration of the effect of these other factors on strategy use.

Students were asked to respond to open-ended questions with little opportunity for them to check their understanding of the questions being asked. Some students were confused between the task and self categories but this did not affect the coding which was carried out as explained earlier. Asking open-ended questions reduced the level of control over the nature of the data collected. For example, if students did not include a particular strategy, it may have been that they did not use it. However, it could have been that they did not realise that it was a relevant strategy – and some students indicated that this was so in their case studies.

It was also not possible to gather details of strategy use. For example, if a student reported taking notes, this could have meant reorganising information and putting it into his or her own words, or simply verbatim copying of information from overheads or a textbook.

Further, it should be noted that data were collected as part of an assessable assignment and, therefore, students may have been concerned to report what they thought the teacher wanted rather than what they really did. However, the impression gained from reading the case studies is that students were prepared to be honest and open about themselves. Some indicated that they might be hypocritical in encouraging the use of effective learning strategies in their students later, while not actually using those strategies themselves!

Since this was a naturalistic study, the sample consisted of real students in a real teaching and learning setting. Students, therefore, came from a range of age groups and backgrounds and were predominantly female. This may be regarded as a strength of the study in that the data collected were related directly to the actual course students were studying, rather than to a set of laboratory tasks. Recent studies highlight the importance of researching student learning in natural, everyday situations, rather than in experimental settings removed from everyday life. For example Zimmerman (1998) examines the everyday use of self-regulatory strategies across

disciplines such as writing, sport and music, as well as academic settings. Turner (2000, p.2) stresses the need to focus on authentic learning settings rather than considering "student membership in classrooms [as] irrelevant or noise in data analyses."

Implications

These findings have implications for teacher education programs, university curricula in general, and for academic staff development.

Teacher Education programs

We cannot assume, as previous research findings suggest, that university students, even those who already have a first degree, will be aware of and use higher-order strategies to enhance their learning. In a general sense it may be that courses, especially one year graduate diplomas, are very intensive and students feel that because of time pressures they do not have time for reflection. Nevertheless it is recommended that knowledge of effective learning strategies be incorporated into course content and that students be encouraged to develop their metacognitive awareness.
Education students need help to be effective learners themselves so that they are able to model strategy use for their own students. Thus, teacher education programs need to develop effective learning skills in their students, preferably in the context of their regular studies (Anderson et al, 1995; Radloff, 1997; de la Harpe & Radloff, in press). The actual course content can include knowledge of a range of strategies and their relative effectiveness in achieving desired learning outcomes. In other courses such as those relating to specific content areas, learning strategies appropriate to those specific areas should be made explicit.

The behaviour of lecturers and tutors in modelling such strategies, providing support and feedback for students attempting new strategies, and in creating an environment where students are able to learn and reflect, is crucial. Archer (1998) deals more specifically with the idea of developing a co-operative environment in order to foster a mastery orientation in students. There is extensive literature indicating how teachers can develop such an environment (Brophy, 1987; Maehr & Midgley, 1991).

Finally, requiring students to reflect on their learning has a positive impact on those students' awareness of their learning processes. Schunk and Zimmerman (1996), discussing the development of self-regulatory skills in children, indicate the importance of processes such as self-monitoring and self-evaluation. In this study, the reflective process was integrated with an assignment. Other courses may use strategies such as journals, self assessment or peer assessment to develop these skills.

Curricula

Courses in educational psychology are particularly well placed to enable students to learn about self-regulated learning and how to enhance its development. Self-regulated learning can also support the enhancement of individual learning by making explicit the learning strategies associated with success in particular contexts – not just those involving prospective teachers – and providing an environment that supports reflective practice.

Staff development

Teaching staff themselves need help and encouragement to integrate knowledge about learning specific discipline content and learning processes. This would be particularly the case in courses outside education in which staff generally have no formal education background.

Effective learners - those who adopt effective learning strategies - are more likely to succeed academically and achieve their learning goals. By explicitly teaching effective strategies and by providing the opportunity for students to reflect on their learning processes, all teachers can help their students to become more self-regulated learners.

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