SELF-REGULATED LEARNING IN STUDENTS' THESIS WRITING

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Abstract:

The aim of this study was to find answers to how self-regulated learning (SRL) and cooperation learning orientation correlate with study success. At DSV, a department of Stockholm University, a web based support system for students' thesis writing referred to as SciPro was implemented. The system also allowed for statistics of thesis process. Through the SciPro system we were able to retrieve students and supervisors; data were retrieved from 45 supervisors and 47 students with regard to their respective responsibilities in the thesis writing process. Vermunt's instrument, Inventory of Learning Styles (ILS), was employed to measure students' SRL. Overall, the relation between SRL and completed thesis was not as strong as expected.

Keywords:

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1   Students' thesis writing

The study was triggered by a significant number of students who did not take the thesis course despite being eligible to do so. Another challenge is that many of those who choose to take the thesis course do not complete it within the stipulated time.

Focusing on aspects such as the culture and demography of the individual might provide an understanding of this phenomenon. For instance, students from upper classes are more likely to adapt to the university culture compared to their counterparts from lower classes (Georg, 2009). Walsh and Associates (2009) suggests that full-time degree students are more likely to continue the studies in the second year compared to part-time students. It suggests part-time students are more likely to have other commitments apart from studying, such as work or the responsibilities of being a parent. The study also suggests if postgraduate and final-year undergraduate students are engaged in university projects that offer support to first year-students, part-time students are less likely to withdraw from the university. Research also suggests lack of good practice may be one reason for low course completion (Wisker, 2007; Wisker, 2005).

Research also suggests that a student's failure to formulate emotion-focused and problem-focused strategies needed to cope with academic stress is another reason (Rijavec & Brdar, 2002). Another concern connected to drop-out rates and learning style is the ability to keep deadlines. Some institutions have tried flexible deadlines with poor results (Hardin, 2004) – the reasons for which is that students tend not to complete their work if not given a fixed deadline. The lack of deadlines increases the number of drop-outs. On the other hand, strict deadlines combined with having free rein over their academic responsibilities, such as completing homework, may increase plagiarism (Palazzo, Lee, Warnakulasooriya, & Pritchard, 2010).

Often a thesis on master's level is to be written in a language that is not the first language of the student. This may cause problems when the student is to deal with academic arguments. Bacha (2010) has noted this in the context of teaching English as foreign language.

Another factor mentioned as a key issue is the degree of self-regulated learning among the students. It has been concluded that when students are self-regulated they are likely to become more successful in their achievements (Mehrjou & Rahbar, 2015). SRL is also vital after college, i.e. in the workplace (Siadaty, Gašević, & Hatala, 2016) and in lifelong learning (Sandars & Cleary, 2011).

At DSV, a web based support system for students' thesis writing referred to as *SciPro* was implemented. SciPro was created to provide a better environment for the thesis writing process, for supervisors, and to better meet industrial needs, which presumably leads to theses of higher quality and students with greater ability to get jobs after

graduation. SciPro provides matching of a student with a supervisor, supports peer interaction, provides student-controlled "state of mind indicator", and provides both students and supervisors with learning resources (Hansson & Moberg, 2011). The system also allows statistics of thesis process.

Drawing on Vermunt's (1994) instrument of *Inventory of Learning Styles* (ILS), this study investigated the degree of *self-regulated learning,* SRL, by relating it to the students' learning outcomes. The aim was to find answers to how SRL and cooperative learning orientation correlate with study success.

1.1 Self-regulated learning

Learning styles remain controversial and are defined in different ways. Here we provide some suggestions from related work. Apart from overall support provided by the institution, a students need SRL skills to cope with complex situations, anticipate, and respond to changes. Learners have been described as self-regulated when they are able to make decisions based on what form of knowledge they need in order to go about a task, and when they are behaviourally active in their learning process (Zimmerman, 1989). According to Beishuizen and Steffens (2011), learning in universities is not fully self-regulated since the student may not freely decide what, when, where, and how to learn. Authors do not generally rely on this broad definition of SRL, however. In its common or narrow sense, SRL has been referred to as students' cognitive and motivational strategies for learning (Friedrich, Jonkmann, Nagengast, Schmitz, & Trautwein, 2013).

Cassidy (2011) concludes that the aggregated effect of goals, metacognitive knowledge and skills and cognitive strategies determines the efficacy of the self-regulation process. SRL can furthermore split up into preactional (e.g. setting goals), actional (e.g. concentration), and postactional (e.g. self-reflection) strategies (Perels, Gürtler, & Schmitz, 2005; Friedrich, Jonkmann, Nagengast, Schmitz, & Trautwein, 2013). Dimensions of students' self-regulated learning in terms of motivational self-regulation, cognitive regulation, and metacognitive regulation have been used to *examine how certain forms of testing impacts students' SRL.* (Merki, 2011).

Research on SRL includes conceptualisation of emotions and how students' emotions change during learning tasks (Ben-Eliyahu & Linnenbrink-Garcia, 2013). Central in SRL is the "autonomy and responsibility of students to take charge of their own learning." (Carnero, Lefrere, Steffens, & Underwood, 2011, s. vii) Carnero et al. (2011, s. vii) suggests that successful self-regulated learners be able to:

1. Recognise a need to learn.
2. Make wise choices in relation to that need.
3. Satisfy that need efficiently and affordably.
4. Sustain their motivation until the job is done.

Even if a learner is able to recognise a need to learn, there may be a friction between learning and teaching style. Vermunt and Verloop (1999) suggest the student's learning style does not necessarily fit with the supervisor's way of teaching or guiding, it could lead to a conflict, where "[t]eaching does not automatically lead to learning" (1999, p. 258). One possible scenario is one where the supervisors believe they have done "everything" and, while having succeeded with other students, cannot understand the failure of this particular student.

Even if the divergent styles of teaching and learning appear to be a significant factor, the solution is not simply to pair up the "right" supervisor with the "right" student. Some institutions may also have a conscious strategy where a few teachers take responsibility for all thesis supervision regardless of orientation within the given discipline. In such cases, it would be difficult to account for all the different ways of supervising and learning. It would not be possible to manage or negotiate the supervisory relationship either (Wisker, 2005). This may result in poor quality of teaching and/or learning, since "[t]eaching strategies and learning strategies are not always compatible." (Vermunt & Verloop, 1999, p. 270)

It has been suggested that learners must have access to information that can transform the ways they learn (Winne, 2005). This information can be provided inside or outside the academia. For instance, Walsh et al (2009) suggests that whilst supervisors and peers are important sources of academic advice, many students need support for talking about non-academic issues, too, such as with friends and family. These suggestions parallel Xuereb (2014) in that family support is central for preventing doubting and withdrawal. A key determinant is accessibility of student support. This means that institutions must provide a student with several types of support apart from the one provided by the supervisor. Hence, complementing the supervisor with other support systems would give departments a better chance to decrease the withdrawal rate or the number of students who do not complete the studies within a stipulated time period.

Findings have emphasised that SRL learners often do not achieve as highly as their instructors intend, although there are scaffolds that enhance learners' SRL outcomes (Winne, 2005). This may be an effect of them finding the lecture or subject matter boring or not having the same goals as their teacher. Students generally perform better when learning activities are perceived interesting, useful and valuable. As a consequence, they will use more SRL strategies, resulting in a higher level of academic achievement (Babakhani, 2014).

2. Method and setting

This study was carried out at the Department of Computer and Systems Sciences (DSV), Stockholm University, Sweden. DSV offers courses at undergraduate and postgraduate levels, as well as delves into research spanning over many ICT fields. In total, more than

300 students take the thesis course each year, of which many are international students.

2.1 Instrument - Vermunt's learning style

Learning styles may be perceived as stable, but not unchangeable, ways in which students learn. This superordinate concept includes the interrelations among various and different learning strategies used by students (Vermunt, 1996; Vermunt & Vermetten, 2004). The Inventory of Learning Styles (ILS), developed using a phenomenographic research approach, focuses on the interplay between self-regulation and external regulation of the learning process (Vermunt & Vermetten, 2004). Vermunt constructed the instrument in the context of a research project on student regulation of learning processes, and the instrument aims at measuring several components of student learning in higher education. The complete instrument consists of 120 items on a 5-point Likert scale. The parts covered include cognitive processing strategies, metacognitive regulation strategies, learning orientations, and conceptions of learning.

Vermunt's Self-Regulated Learning instrument is employed and as a first step its reliability in this particular context is tested.

This study uses the items with regard to regulation strategies and three out of four parts with learning orientation items. We did not translate the questions from English to Swedish for two reasons. Firstly, the international students' shared language is English. Secondly, we wanted to investigate the internal consistency of the original instrument among the bachelor's (B.A.) and master's (M.A.) students. We could however expect reliability threats due to cultural differences (J.T.E., 2004). That is the main reason we conducted a reliability test.

The comparison of students who passed the exam and students who dropped out or did not finish their thesis within the stipulated time is reported as effect size with consideration to the standardised mean difference between two populations. The effect size estimates the strength of an apparent relationship, rather than assigning a significance level reflecting whether the relationship could be a result of chance.

2.2 Distribution of survey

Through the SciPro system we were able to retrieve students and supervisors. A web survey was distributed to students and supervisors. The tools used were LimeSurvey 1.71. In order to reach the supervisors, their staff e-mail was used; and to reach students, the e-mail address they have put in DSV's administrative system was used.

With the SciPro system, supervisors (=56) available for the period were determined. In a similar manner, the number of students (=229) who were eligible to undertake the thesis course at the time was determined. 45 supervisors (80%) and 47 students (21%) answered the questionnaire.

3. Results and analysis

Vermunt and Vermetten (2004) reports on internal consistencies for several studies of Crombach's alpha values 0,48 to 0,79 for *regulation strategies* and 0,57 to 0,84 for *learning orientations* for regular students. For Open University students, the Crombach's alpha values varied between 0,67 and 0,81 for *regulation strategies* and between 0,74 and 0,86 for *learning orientations.*

The internal consistency for our conducted survey is thus in line with the studies reported by Vermunt and Vermetten regarding the regulation strategies and the subscale *cooperation learning orientation* (Table 1), spanning between 0,50 and 0,87. The reliability is at the same level as the maximum of some other studies. However, weak support was indicated for the internal consistency of sub scales *personally interested learning orientation, 0,54,* and *certificate-directed learning orientation, 0,50,* in our study. It was rather lower than the minimum limit reported by Vermunt and Vermetten.

Despite the quality of thesis writing of B.A. and M.A. students, and the differing levels of proficiency of the English language, the items in ILS seem to be methodology trustworthy for regulation and cooperation strategies. The items describing personally and certificate directed orientations have a low reliability in the used educational setting (Table 1).

Table 1, Internal consistencies of ILS.

Regulation scales and subscales	Items	Cronbach's alpha
Scale Self-regulation	11	0,81
Subscale Self-regulation of Learning processes and results	7	0,75
Subscale Self-regulation of Learning content	4	0,52
Scale External regulation	11	0,79
Subscale External regulation of Learning processes	6	0,74

Subscale External regulation of Learning results	5	0,60
Scale Lack of regulation	6	0,76
Scale Learning orientations		
Scale Personally interested	5	0,54
Scale Certificate directed	5	0,50
Scale Cooperation	8	0,87

Self-regulated learners by definition should take more responsibility for their own learning process and should be expected to complete their study assignments within a certain stipulated period. In the present study, this seems not to be the case (Table 2).

Table 2, SRL and Cooperation and study success.

Regulation scales and subscales	Items	Registered but not passed N=29 Mean	Passed N=12 Mean	Effect size standard-ized values
Scale Self-regulation	11	3,0	2,6	0,62
Scale External regulation	11	3,1	3,1	0,04
Scale Lack of regulation	6	2,5	2,4	0,00
Scale Personally interested	5	3,7	3,5	0,30

Scale Certificate				
directed	5	3,3	3,2	0,10
Scale Cooperation	8	3,5	2,8	0,88

Students who did not write their thesis in the stipulated time interval had indicated higher values on the Likert scale on Self-regulation (Table 2). Whether an effect size is interpreted as small, medium, or large depends on substantial context and operational definition, but an effect size of 0,60 or more is often considered a high value; accordingly, the *self-regulation* value of 0,62 is interesting to follow up on, though the number of students was limited.

The effect size is 0,62, which was not expected to show that students who do pass the exam has indicated a lower value on self-regulated learning. A high competence in regulating one's own studying is regarded as a variable normally correlating with study success. This result will be interesting to follow up in future investigations.

Students who have not completed their tasks have come out higher on the Likert scales on the sub scale cooperation (part of learning orientations). The values have a high effect size of 0,88. This result can be interpreted in different ways. Perhaps the part of learning orientation that this subscale represents is a hinder in this educational setting. The thesis writing is mainly the students' own responsibility, although support systems and system that facilitate collaboration are used. The effect sizes for external regulation and lack of regulation are low or even zero. These results will also be of great interest to follow up when more functionality in the support system is implemented and utilized.

4. Concluding discussion

This study investigated the degree of self-regulated learning, SRL by relating it to the students' learning outcomes. The aim was to find answers to how SRL and cooperative learning orientation correlate with study success.

A high reported Self-Regulated Learning and cooperation learning orientation measured by the ILS instrument does not correlate with study success. These results are not analogous to other studies and were not expected in these educational setting.

SciPro has been developed in order to more efficiently handle the thesis process. The purpose of SciPro is to serve students, supervisors, and administrators (e.g. unit directors, directors of studies), but also external stakeholders; e.g. Companies that wants to reach and attract students for a thesis project. Through SciPro we were able to detect

students how did not submit their project idea prior to course start in order to undertake the thesis course though they were eligible to do so. Learning this behaviour, we believe, could help institutions to understanding how students think around their undertaking the thesis course. For instance, our study deals with issues regarding:

- Why students do not apply for the thesis course
- What guidance they need in order to undertake the course and prior to course start
- How they think around the issues of instructions and course preparations.

Only 21% of the students answered the survey. We have not investigated the cause. Lack of time? Generally fed up with surveys? The students do not feel that this affects them? Students are afraid of some form of negative reprisals? Whatever the reason, it would be fruitful to reach a few of those students in order to learn why they did not want to participate. Because of poor response rate of students, we might not have been able to target all cultural difference types, ILS types, and academic success types of students with such convenient sample. Hence the sample did not consider how cultural influences relate to self-directed learning, cooperative learning, and academic success on thesis writing. Covering cultural aspect can provide answers we did not get. Ylijoki (2001) explores the cultural core narratives of storylines of thesis writing analysing 72 one-year master students from Finland. The study identified four core narratives of thesis writing, namely heroic, tragic, business-like, and penal stories. Its narrative illustrate that student may regard the supervisor as busy and may hesitate before contacting the supervisor. A benefit of its narrative is to teach the student to think about her/his situation in thesis writing. For instance by analysing her/himself the student may be able to act upon events that could lead the student into a failure in terms of completing the thesis within a stipulated time. This is an effect of not only one kind of student can be a protagonist within a particular cultural story, but act within different stories.

Our research did not focus on gender issues either. Contrary to Wright and Cochrane (2000), Stratton et al (2007) found it is more likely being a woman and drop out than being a man. This contradiction may be an effect of Stratton and associates' approach. Specifically, the study stated that attrition rates are higher for part-time students than for full-timers. Though, "there has been little research explicitly comparing the reaction functions across these two student populations" (Stratton, O'Toole, & Wetzel, 2007, s. 454). The study also focuses on drop-out behaviour from higher education in general. Another notable result is that both women and especially men who got married while in college were significantly more likely to drop out. Also having children can increase a student's drop-out rate especially among women. Lassibille and Gómez (2008) study on higher education students' drop-out in Spain stated there is no significance different between women and men, whilst older men are more likely to drop-out than older women. However, studies seem to agree upon student from a poorer socio-economic environment tend to drop-out more frequently. Studies also seem to agree upon it occurs

an important relation between a student and a supervisor that can affect the drop-out rate. It is there imperative to the extent possible consider learning style and supervision style among students and supervisors when matching.

In order to address further concerns in higher education surrounding teaching and learning style and responsibilities in thesis writing, we are conducting more studies on SRL as well as student to supervisor matching. For instance, we are following up this study using the same design plan for a higher response rate and use the part of the ILS instrument that meets the requirements for internal consistency

The results from this study will be used internally to improve supervising assistance and the thesis process. Nevertheless, the results should also serve for other universities. As previous studies indicate, most universities face similar problems in terms of thesis courses, supervision and thesis writing.

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