Differences in regulation and efficiency of learning between traditional and non-traditional students

Based upon the bachelor program Physiotherapy of Avans
University of Applied Sciences

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Abstract

The aim of this study was to research in which aspects of regulation of learning the traditional and non-traditional students, attending the Bachelor of Health study programme of Physiotherapy at Avans University of Applied Sciences, differ and if non-traditional student learn more efficient than traditional students.

Significant differences between traditional students (enter higher education for the first time and are younger than 24 years) and non-traditional students (are 24 years or older and have specific reasons to enter higher education), were identified on 13 of the 16 MSLQ-ILS scales. On the Rehearsal scale the traditional students score significant higher than non-traditional students. From the 16 scales, 12 scales were found significant different in favour of non-traditional students. Non-traditional students are more able to regulate their learning than traditional students in the areas of cognition, motivation, behaviour and context.

Non-traditional students scored significantly higher on performance on a multiple-choice Physiotherapy test. They scored a non-significant lower mental effort during the test than traditional students. The efficiency of learning was found significantly higher in favour of non-traditional students. It can be concluded that non-traditional students learn more efficient than traditional students.

Introduction

Lecturers at the Academy of Health of Avans University of Applied Sciences assume that traditional and non-traditional students differ in regulation and efficiency of learning. Based on these assumptions a non-traditional part-time study programme has been developed in 2008 for the Bachelor of Health study programme of Physiotherapy. The aim of this research is to discover if and in which aspects of regulation and efficiency of learning traditional and non-traditional students differ. The non-traditional part-time study programme for the Bachelor of Health study programme of Physiotherapy can be adapted based on these study results.

Traditional and non-traditional

Traditional students are considered to be less than 24 years of age; non-traditional students are 24 years of age and older (Jinkens, 2009). Jinkens (2009) also states that age is not always the right way to classify, as some students may have the characteristics of a traditional student all their lives and some students will have the characteristics of a non-traditional student early in life.

According to Jinkens (2009) traditional students are more focused on getting high grades, non-traditional students are more focused on what they can do with the knowledge obtained. Jinkens (2009) describes the characteristics for a traditional and non-traditional student besides age: non-traditional students are more serious and more motivated because they have specific reasons to attend college (for example the financial support of family), they do not need much encouragement, and they are self motivated. Traditional students have the opposite characteristics: less serious, less motivated and need more encouragement (Jinkens, 2009).

Ronning (2009) states that this increasing group of non-traditional students faces several challenges. These challenges (studying off campus, having working and family obligations) cause an increased total workload and therefore these students have to acquire highly self regulated behaviour.

Non-traditional students are searching for meaning and relevance connected to their working life situation and experience (Ronning, 2009). First time non-traditional students are significantly more reproducing orientated than students with prior experience in higher education. These non-traditional students with prior knowledge of higher education are familiar with the study culture in academia and were able to apply a better approach to studying. Age is also an important factor; the younger students are more reproducing orientated (surface learning), the older students more meaning orientated (deep learning) (Ronning, 2009).

Non-traditional students have an impressive ability to reorganize their life and fit their studies into the total situation. Good time management is associated with a meaning orientation, poor management with reproducing orientation, this confirms that there is a close connection between self regulated behaviour, metacognition, and the quality of learning also among non-traditional students (Ronning, 2009). Ronning (2009) finds that self-efficacy has the strongest relation to approaches in study strategy. It is negatively related to the reproducing approach, indicating that exposing a more uncertain, inexperienced approach to study is connected with doubts about one's own mastery (Ronning, 2009).

Regulation of learning

Within the learning process Pintrich (2004) distinguishes four phases and areas in regulation of learning (Table 1). These four areas are (1) cognition, (2) motivation/affect, (3) behaviour and (4) context. From the self regulated learning (SRL) perspective (Pintrich, 2004), students are actively involved in their learning process. They can monitor, control and

regulate aspects of their cognition, motivation, behaviour and some features of their surroundings. The processes of regulation and self regulation can be represented into four time-ordered phases. These phases are (1) forethought, planning and activation, (2) monitoring (metacognitive awareness), (3) control and regulation and (4) reaction and reflection.

Table 1

Phases and Areas for Self-Regulated Learning (Pintrich, 2004)

	Areas for regulation			
	Cognition	Motivation/Affect	Behaviour	Context
Phase 1 Forethought, planning, and activation	Target goal setting	Goal orientation adoption	Time and effort planning	Perceptions of task
	Prior content knowledge activation	Efficacy judgments	Planning for self observations of behaviour	Perceptions of context
	Metacognitive knowledge activation	Perceptions of task difficulty	Task value activation	Interest activation
Phase 2 Monitoring	Metacognitive awareness and monitoring of cognition	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help	Monitoring changing task and context conditions
			Self-observation of behaviour	
Phase 3 Control	Selection and adaptation of cognitive strategies for learning, thinking	Selection and adaptation of strategies for managing, motivation, and affect	Increase/decrease effort	Change or renegotiate task
			Persist, give up	Change or leave context
			Help-seeking behaviour	
Phase 4 Reaction and reflection	Cognitive judgments Attributions	Affective reactions Attributions	Choice behaviour	Evaluation of task Evaluation of context
Relevant MSLQ Scales	Rehearsal	Intrinsic Goals	Effort Regulation	Peer Learning
	Elaboration	Extrinsic Goals	Help-Seeking	Time/Study Environment
	Organization	Task Value	Time/Study Environment	
	Critical Thinking	Control Beliefs		
	Metacognition	Self-Efficacy		
		Test Anxiety		

Based on these areas and aforementioned phases Pintrich (2004) designed a conceptual framework for research on motivation and learning of college students. Pintrich (2004) suggests that the framework is a blueprint for development of instruments that measure motivation and learning of college students.

Cognition

Pintrich (2004) states that the first regulation area, the one of cognition, represents the activities, tactics and strategies that students engage in to plan, monitor and regulate their cognition. Cognitive control and regulation includes the types of cognitive and metacognitive activities. Metacognition is important in monitoring cognition (Phase 2 of the conceptual framework; Pintrich, 2004).

Metacognitive skills are being used to regulate and monitor cognitive processes. Metacognitive skills are reasoning, planning, programming, problem solving behaviour, selecting, self initiated searching, transferring, evaluating, social monitoring and making choices deliberately (Jolles, 2007; Woolfolk, Hughes & Walkup, 2008). Vermunt (1996) states that metacognitive regulation activities are directed at regulating the cognitive and affective learning activities. Cognitive processing activities are those that people use to process the content to be learned, these activities lead to learning outcomes in terms of knowledge, skills and attitudes. Affective learning activities concern coping with the feelings that occur during learning, which may have a positive or negative effect on the progression of the learning process.

Jolles' (2007) research states that particular parts of the brain (frontal cortex) develop in late adolescence. The adolescent integrates earlier acquired functions and consciousness and self regulated processing of information arises. The development of metacognitive skills takes place in these parts of the brain. There is an individual difference in cognitive development, which leads to differences in how well and how quickly people learn (Woolfolk et al., 2008). Non-traditional students generally are older compared to traditional students. So based on the development of the brain, non-traditional students should be able to monitor their learning process more efficiently compared to traditional students.

Motivation

The second area of regulation is motivation. Like students can control their cognition, they are also able to control motivation and affect. Students in higher education use several strategies to keep themselves motivated; they use external orientated goals like achieving good grades, they give themselves incentives and they make the task more interesting and

practical (Pintrich, 2004). The items of the MSLQ (Motivated Strategies for Learning Questionnaire) about motivation consider motivational beliefs (Pintrich & De Groot, 1990). In motivational beliefs a distinction can be made in intrinsic and extrinsic motivation. Intrinsic motivation sustains personal factors, personal needs and interests. Extrinsic motivation concerns external factors which influence a person, like incentives, punishments and social pressure (Woolfolk et al., 2008).

Context

The Academy of Health uses the student-centred approach. In the more student-centred approach, students have influence on the context and environment of learning (like projects, experiments and collaborative learning groups). Students, who are able to control and regulate their study environment, are able to resist distractions and have an organized place for studying (Pintrich, 2004).

Behaviour

Time and effort planning are part of behavioural control. Students attempt to control their effort in order to achieve good grades. When students are able to control their effort towards difficult and boring tasks, they are capable of regulating their behaviour towards these tasks. Time planning or management involves making schedules when to study which subject and setting priorities. Help-seeking is another behavioural regulatory strategy. Students who are able to self regulate their behaviour know when, why and from whom to seek help (Pintrich, 2004). Non-traditional students have several activities besides their study, like work and running a household. The need for planning and controlling effort is higher for non-traditional students compared to traditional students. These behavioural regulatory strategies could lead to a more efficiently approach to learning (Pintrich, 2004).

Motivated Strategies for Learning Questionnaire (MSLQ)

The Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990) is a validated and practical instrument that measures all four areas of regulation in the framework (Pintrich, 2004). Pintrich and De Groot (1990) conducted one of the first empirical studies using the MSLQ. Further development of the instrument led to an 81 item self reported questionnaire for assessing college students' motivational orientations and their use of different learning strategies (Pintrich, Smith, Garcia & McKeachie, 1991).

Jacobsen and Harris (2008) investigated the differences between traditional and non-traditional students measured with the MSLQ. Differences between traditional and non-traditional students were found for 10 out of 15 scales. Jacobsen and Harris (2008) found that

the non-traditional student differed significantly on four motivation scales: Internal & External Goal Orientation, Task Value and Test Anxiety. Internal Goal Orientation and Task Value can be explained by the motivation of a non-traditional student, who is motivated by job improvement, personal interest, employment requirements and an improvement in standard of living. The significant difference on External Goal Orientation can be explained by the fact that traditional students do not have the life experience necessary to set clear career and education goals (Jacobsen & Harris, 2008).

The learning strategy scales Elaboration, Organization, Critical Thinking, Metacognitive Self Regulation, Effort Regulation and Help Seeking differed significantly in the comparison of traditional and non-traditional students. The non-traditional students scored significantly higher than the traditional students, except for Help Seeking. On Help Seeking the traditional students scored significantly higher. These results support the theory that self regulated behaviour is a combination of a variety of strategies. These six learning strategy scales are described in literature as the critical elements of a self-regulated learning model (Jacobsen & Harris, 2008).

The MSLQ does not cover all self-regulatory strategies. Nevertheless the MSLQ can be used to research the areas of regulation (Pintrich, 2004). Entwistle and McCune (2004) reviewed seven study inventories in order to find differences and overlaps. In their research Entwistle and McCune (2004) compared the constructs of the Inventory Learning Styles (ILS) and the MSLQ to each other and to other inventories. They found that the MSLQ is distinctive in measuring metacognition and self-regulation.

Inventory Learning Styles (ILS)

Vermunt (1996) includes self-regulation in the ILS. The ILS contains items at different levels of learning; deep learning (critical processing, relating ideas and structuring) and surface learning (memorization and rehearsal). The MSLQ concentrates on the aspect of deep learning and contains only two items referring to surface learning.

Vermunt and Vermetten (2004) state that regulatory activities are, for example, orienting on a learning task, monitoring the learning process, diagnosing the cause of difficulties and changing learning activities during the process. These activities are similar to Pintrich's phases of regulation of learning. Vermunt and Vermetten (2004) have reviewed several articles about learning strategies. They distinguish three main regulation strategies: (1) self-regulated strategy; students perform regulation activities by themselves, (2) externally regulated strategy; students let their learning process be regulated by teachers or

books and (3) lack of regulation; students are unable to regulate their learning and experience insufficient support of their surroundings. The aim of Vermunt's and Vermetten's research (2004) was to integrate existing constructs of student learning and to connect metacognition of student learning to motivation and cognitive processing.

One of the conclusions of this review (Vermunt & Vermetten, 2004) is that older or more experienced students show greater ability to differentiate various learning strategies, conceptions and orientations and show stronger interrelations between those concepts than younger or less experienced learners. Furthermore Vermunt and Vermetten (2004) conclude that older students regulate both internally and externally. Older students adjust their learning activities when they face difficulties, they monitor their learning process in order to imagine the subject more specific and to apply it. Older students find they master the subject when they are able to understand the relation between theory and practice (Vermunt, 1996). When combining the MSLQ and the ILS both levels of learning (deep and surface) can be taken into account.

Efficiency of learning

The areas of cognition and behaviour (Pintrich, 2004) are related to brain development and efficiency of learning. Based on the cognitive load theory, Paas and Van Merriënboer (1994) developed a research method for measuring the student's efficiency of learning.

The cognitive load theory is based on the very limited capacity of the short-term memory. Learning takes place when information is transferred from the short-term memory to the relatively unlimited long-term memory (Paas, Tuovinen, Tabbers & Van Gerven, 2003). Cognitive load represents the load that performing a particular task imposes on the cognitive system of the learner (Paas & Van Merriënboer, 1994).

In the view of Paas and Van Merriënboer (1994) the model has a causal and an assessment dimension. The causal dimension suggests interaction between task and student characteristics. The assessment dimension reflects the measurable construct of mental effort and performance. Mental effort is estimated during working on the task. Performance can be estimated during working, in terms of time on task and in terms of correct number of items and number of errors can be measured afterwards. Paas and Van Merriënboer (1994) suggest that the intensity of mental effort is essential for an appropriate way to measure cognitive load.

In their first research on estimating cognitive load and efficiency of learning, Paas and Van Merriënboer (1993) let participants score mental effort on a Likert's scale from 1 (very

very low mental effort) to 9 (very very high mental effort) while performing a particular task. The reliability, sensitivity and user-friendliness make the scale the most frequently used in measuring Cognitive Load (Paas et al., 2003).

Van Gog, Kirshner, Kester and Paas (n.d.) recommend estimating mental effort to be done repeatedly. Their experiments reveal that the whole experienced mental effort is more than the sum of its parts. When mental effort was measured right after performing a task, learners experience less mental effort than when measured after a sequence of tasks.

Research on differences in regulation and efficiency of learning

Literature indicates differences between traditional and non-traditional students on regulation of learning and efficiency of learning exists. There is no clear evidence that these differences can be applied to traditional and non-traditional students Physiotherapy of the Academy of Health of Avans University of Applied Sciences. This study focuses on the differences in learning and how these differences can influence outcomes on the MSLQ. The following research and two investigative questions serve to guide this study. Are there differences in regulation of learning and in efficiency of learning between traditional and non-traditional students Physiotherapy of the Academy of Health of Avans University of Applied Sciences? (1) What differences in regulation of learning can be determined between traditional and non-traditional students Physiotherapy? (2) What differences in efficiency of learning (combining mental effort and performance) can be determined between traditional and non-traditional students Physiotherapy?

Method

Setting

The educational program of Physiotherapy is a four-year bachelor program. Avans University of Applied Sciences is located in Breda, the Netherlands. The educational program of Physiotherapy is designed for traditional and non-traditional students. The student population consists of 175 traditional freshman students and 75 non-traditional freshman students.

The preparatory education of traditional students is secondary education (HAVO or VWO) or senior secondary vocational education and training (MBO). The entry requirement of the part-time bachelor program is a bachelor degree, regardless whether this education is related to Physiotherapy or not. All participants take part in the same educational program

and take the same assignments, only non-traditional students take lessons on certain days in the week.

Participants

The total population consisted of 250 freshman students from the bachelor program Physiotherapy of Avans University of Applied Sciences. For the Efficiency of Learning instrument 250 students (100%) of the total population were surveyed and of those 175 were traditional students (70%) and 75 non-traditional students (30%). For the Regulation of learning instrument 181 students (72%) of the total population were surveyed and of those 137 were traditional students (76%) and 42 non-traditional students (23%). Two cases were removed from the data set due to incomplete data leaving 179 cases available for analysing the descriptive statistics. Table 2 shows a comparison of the total student percentage with the total sample percentage and frequencies.

Table 2

Comparison of sample subject for Traditional (T) and Non-Traditional (NT) students

		Total Student Percent		Total Sample Percent (n=179)		Frequency	
		T (n=137)	NT (n=42)	T	NT	T	NT
Gender	Male	42	48	32	11	57	20
	Female	58	52	45	12	80	22
Age	Younger than 24 yrs	99	7	75	2	135	3
	Older than 24 yrs	1	93	1	22	2	39
Education	MBO, HAVO & VWO	100	17	76	4	136	7
	HBO & WO	0	83	0	20	0	35
Children	Yes	0	24	0	6	0	10
	No	100	76	76	18	137	32
Job	No job	19	2	14	1	26	1
	Less than 16 hrs*	72	5	55	1	98	2
	More than 16 hrs*	9	93	7	22	13	39
Study hrs	Less than 75%**	48	38	38	8	60	13
	More than 75%**	52	62	41	13	64	21

Note. * Working hours per week; ** Study hours per week, Traditional programme consists of 40 hours per week, Non-traditional programme consists of 22 hours per week.

Table 3

Components of the MSLQ (Pintrich et al., 1991), added with the ILS (Vermunt, 1997) divided in the areas of regulation (Pintrich, 2004)

Area	Scale	e.g. Item	Code	N_{items}
Cognition	Rehearsal	When I study for this class, I practice saying the material to myself over and over.	(Reh)	4
	Elaboration	I try to relate ideas in this subject to those in other courses whenever possible.	(Elab)	6
	Organization	I make simple charts, diagrams, or tables to help me organize course material.	(Org)	4
	Critical thinking	I try to play around with ideas of my own related to what I am learning in this course.	(Crit)	5
	Metacognitive Self-Regulation	When reading for this course, I make up questions to help focus my reading.	(Mcg)	12
Motivation/ Affect	Intrinsic Goal Orientation	In a class like this, I prefer course material that really challenges me so I can learn new things.	(Intr)	4
	Extrinsic Goal Orientation	Getting a good grade in class is the most satisfying thing for me right now.	(Extr)	4
	Task Value	I think the course material is this class is useful for me to learn.	(Tskv)	6
	Control of Learning Beliefs	If I try hard enough, then I will understand the course material.	(Cont)	4
	Self efficacy for Learning and Performance	I'm confident I can do an excellent job on the assignments and test in this course.	(Slfef)	8
	Test Anxiety	When I take a test I think about how poorly I am doing compared with other students.	(Tanx)	5
Behaviour	Effort Regulation	Even when course materials are dull and uninteresting, I manage to keep working until I finish.	(Eff)	4
	Help Seeking	I try to identify students in this class whom I can ask for help if necessary.	(Hsk)	4
	Self-Regulation (ILS)	I try to create examples when studying course material.	(Selfreg)	18
Context	Time & Study Environmental Management	I have a regular place set aside for studying.	(Tsdy)	8
	Peer Learning	I try to work with other students from this class to complete the course assignments.	(Prlrn)	3
	N_{items} total			99

Instruments

The survey instrument used to collect the data for the regulation of learning was a self-questionnaire based on the MSLQ (Pintrich et al., 1991) and a part of the ILS (Vermunt, 1996): the MSLQ-ILS questionnaire (see Appendix 1). The MSLQ consists of 81, self-report items. Pintrich et al. (1991) divided the MSLQ into two broad categories: (1) a motivation section and (2) a learning strategies section.

According to the Manual for the use of the MSLQ (Pintrich et al., 1991) the motivation section consists of 31 items that assess students' goals and value beliefs for a course, their beliefs about their skill to succeed, and their anxiety about tests. The learning strategy section includes 31 items regarding students' use of different cognitive and metacognitive strategies. In addition, the learning strategies section includes 19 items concerning student management of different resources (Pintrich et al., 1991).

According to Pintrich (2004), the MSLQ (Pintrich et al., 1991) is limited in measuring regulation of learning, because the development of the MSLQ started in the early 1980s and was finalized in 1991. New insights about brain development and learning strategies were discovered and thus not integrated. Based on this information a new instrument was developed and the MSLQ (Pintrich et al., 1991) was complemented with a part of the ILS (Vermunt, 1996) about self-regulation. The ILS part added to the MSLQ scales is a 16th scale called self-regulation (Vermunt, 1996).

Pintrich et al. (1991) provided previous validation data for the MSLQ used in the current study. A detailed results section of the original analyses of data is provided in the MSLQ manual (Pintrich et al., 1991). Vermunt (1987) also provided previous validation data for the ILS-items used in the current study. Some of the same analyses were completed with the current sample to assure that the MSLQ-ILS questionnaire was valid with the subjects used in this study.

In this study the 16 scales of the MSLQ-ILS questionnaire are not divided in the two sections (motivation and learning strategies) of Pintrich et al. (1991) but in the four areas of regulation (cognition, motivation, behaviour and context) of the conceptual framework (Pintrich, 2004) (Table 3). The Self-regulation scale is assigned to the area of Behaviour, the scale of Time & Study Environmental Management is assigned to the area of Context.

The survey instrument used to collect the data for the efficiency of learning was an instrument by Paas and Van Merriënboer (1994). Efficiency of learning is measured by combining performance results and mental effort (Paas et al., 2003). Paas and Van Merriënboer (1993) conducted a formula to estimate the efficiency of instructional conditions:

$$E = \frac{Z_{Performance} - Z_{Mental\ Effort}}{\sqrt{2}}$$

The survey instrument to collect performance results was a theoretical multiple choice physiotherapy test (Cronbach's Alpha = .84). The instrument to collect mental effort was the

9 point Likerts scale question to determine cognitive load during the multiple choice physiotherapy test (Figure 1).

"How much effort did you put into this learning assignment?"

1	2	3	4	5	6	7	8	9
O	O	O	O	O	O	O	O	O
Very very low mental effort	Very low mental effort	Low mental effort	Quit low mental effort	Not low, not high mental effort	Quit high mental effort	High mental effort	Very high mental effort	Very very high mental effort

Figure 1. Mental effort 9 point Likerts scale question (Paas & Van Merriënboer, 1994).

Design and procedure

This quasi-experimental research is designed to investigate the differences between traditional and non-traditional physiotherapy students of the Academy of Health on regulation of learning. The sample of the population is selected; the groups of traditional and non-traditional already exist. There is no control group.

After receiving permission from the board of the Academy of Health of Avans University of Applied Sciences time was scheduled with lecturers in classes to survey the students. Information accompanied the MSLQ-ILS questionnaire requesting students' cooperation in an effort to add to research. Surveys were completed by the students' using an online survey program called Lime survey. It took respondents approximately 25 minutes to complete the MSLQ.

In advice to Van Gog et al. (n.d.) the mental effort was measured repeatedly. The 9 point Likert's scale of Paas and Van Merriënboer (1994) was integrated in the theoretical multiple choice physiotherapy test, after every cluster of questions about one subject the students were asked to score the Likert's scale. The mean score of every student will be combined with the performance result on the multiple choice test, in order to measure the efficiency.

Results

From the total population of 250 freshman students 181 MSLQ-ILS questionnaires were collected (72%). From these 181 questionnaires cases with missing data were excluded listwise, leaving 167 surveys to determine the reliability and further analysis. The differences between traditional and non-traditional students are investigated on the four areas of

regulation of learning (cognition, motivation, behaviour and context) measured by the MSLQ-ILS questionnaire.

Table 4

Reliability Analysis of Individual Subscales of the MSLQ-ILS using total sample

Area	Scale	N_{items}	N	Mean	SD	Min	Max	Alpha
Cognition	Rehearsal	4	158	18.61	4.10	7.00	27.00	.71
	Elaboration	6	158	24.98	4.18	11.00	34.00	.75
	Organization	4	159	13.91	3.39	4.00	21.00	.62
	Critical Thinking	5	158	21.60	4.44	11.00	31.00	.67
	Metacognitive Self Regulation	12	158	52.37	8.62	26.00	75.00	.76
Motivation	Intrinsic Goal Orientation	4	167	16.86	2.42	8.00	21.00	.61
	Extrinsic Goal Orientation	4	166	22.23	3.40	9.00	28.00	.67
	Task Value	6	166	32.81	3.87	20.00	42.00	.73
	Control of Learning Beliefs	4	167	21.38	3.23	8.00	28.00	.58
	Self-efficacy	8	165	33.96	5.32	12.00	46.00	.82
	Test Anxiety	5	166	19.12	6.43	5.00	34.00	.80
Behaviour	Time & Study Environment	3	158	28.85	5.27	12.00	40.00	.71
	Effort Regulation	4	158	13.42	3.19	3.00	21.00	.61
	Help Seeking	4	158	10.83	2.22	2.00	14.00	.78
	Self-Regulation	18	158	70.58	11.66	42.00	106.00	.79
Context	Time & Study Environment	8	158	28.85	5.27	12.00	40.00	.71
	Peer Learning	3	160	15.58	3.05	3.00	21.00	.61

Reliability

A reliability analysis was performed for all 16 scales within the four areas represented by the MSLQ-ILS questionnaire to determine the reliability for each scale of the questionnaire. Cronbach's alpha and item-rest correlations were analysed for each individual scale. Measurements were on group level, scales were determined reliable with Cronbach's alpha higher than .60. Furthermore an independent sample *t*-test was conducted for all 99 items of the questionnaire, to determine the difference ($\alpha < .05$) between traditional and non-traditional students per item. Results of the reliability analysis per scale by Cronbach's alpha and the analysis per item by independent sample *t*-test were compared.

From these 99 items 45 were significantly (p < .05) measuring the differences between traditional and non-traditional students. From these 45 items, seven previous deleted items,

based on reliability analysis by Cronbach's alpha, were included again based on the *t*-test analysis ($\alpha < .05$) of the individual items (see Appendix 1).

After the reliability and *t*-test analyses 11 items were deleted ($r_{ir} < .3$ and an increasing Alpha if item deleted) from the 99 items original MSLQ-ILS questionnaire (see Appendix 1). Fifteen scales were found reliable (Cronbach's alpha > .60) as shown in table 4. Although the scale of Control of learning beliefs was found less reliable (alpha = .58), it scored a moderate reliability for our sample, it was still taken in to account in further analyses to find significant differences for our students.

Statistical analysis of Regulation of Learning

An independent sample *t*-test ($\alpha < .05$) performed in the area of cognition of the MSLQ-ILS indicated significant differences (Table 5) between traditional and non-traditional Physiotherapy students in the scales Rehearsal ($t(156) = 2.48$, p = .014), Elaboration ($t(156) = -2.82$, p = .005), Critical Thinking ($t(156) = -3.36$, p = .001) and Metacognitive Self Regulation ($t(156) = -3.10$, p = .002).

On the Rehearsal scale, the traditional students score significant higher. On the Elaboration, Critical Thinking and Metacognitive Self Regulation scales the non-traditional students score higher. On the Organization scale ($t(157) = -.86$, p = .39) the non-traditional students score higher, but the difference was not significant.

The independent sample *t*-test ($\alpha < .05$) performed in the area of motivation indicated significant differences (Table 5) between traditional and non-traditional Physiotherapy students in the Intrinsic Goal Orientation ($t(165) = -3.09$, p = .002), Task Value ($t(164) = -3.02$, p = .003), Self-efficacy ($t(164) = -2.99$, p = .003) and Test Anxiety ($t(164) = -2.80$, p = .006) scales. The non-traditional students score significant higher on these scales. The traditional students score higher on the motivation scales Extrinsic Goal Orientation ($t(164) = .26$, p = .80) and Control of Learning Beliefs ($t(165) = 1.11$, p = .27), however those differences were not significant. In addition the Control of Learning Beliefs scale was also not reliable.

The independent sample *t*-test ($\alpha < .05$) performed in the area of behaviour indicated significant differences (Table 5) between traditional and non-traditional students in the Effort Regulation ($t(156) = -4.06$, p < .001), Help Seeking ($t(156) = -2.29$, p = .024) and Self Regulation ($t(156) = -2.70$, p = .008) scales. The non-traditional students score significant higher on those scales.

The independent sample *t*-test (α < .05) performed in the area of context indicated significant differences (Table 5) in the Time and Study Environment (*t*(156) = -2.93, p = .004) and Peer Learning (*t*(158) = -2.20, p = .030) scales, in favour of the non-traditional students.

Table 5

Independent sample t-test of the MSLQ-ILS between traditional and non-traditional physiotherapy students

Area	Scale	Traditional students		Non-traditional students			
		Mean	SD	Mean	SD	t	Sig.
Cognition	Rehearsal	19.02	3.85	17.09	4.67	2.48	.014*
	Elaboration	24.50	4.20	26.74	3.69	-2.82	.005**
	Organization	13.79	3.30	14.35	3.72	-.86	n.s.
	Critical Thinking	21.00	4.10	23.79	4.97	-3.36	.001**
	Metacognitive Self Regulation	51.28	8.07	56.32	9.52	-3.10	.002**
Motivation	Intrinsic Goal Orientation	16.55	2.42	17.89	2.12	-3.09	.002**
	Extrinsic Goal Orientation	22.27	3.42	22.11	3.39	.26	n.s.
	Task Value	32.33	3.84	34.46	3.56	-3.02	.003**
	Control of Learning Beliefs	21.53	3.22	20.87	3.26	1.11	n.s.
	Self-efficacy	33.32	5.25	36.22	5.00	-2.99	.003**
	Test Anxiety	18.39	6.17	21.68	6.72	-2.80	.006**
Behaviour	Effort Regulation	12.90	3.17	15.29	2.52	-4.06	<.001***
	Help Seeking	10.62	2.27	11.59	1.86	-2.29	.024*
	Self Regulation	69.30	11.35	75.26	11.74	-2.70	.008**
Context	Time & Study Environment	28.23	5.29	31.15	4.57	-2.93	.004**
	Peer Learning	15.31	3.08	16.59	2.74	-2.20	.030*

Note. *p < .05, **p < .01, ***p < .001, n.s. = non significant.

Statistical analysis of Efficiency of learning

An independent sample *t*-test (α < .05) was performed on Performance, Mean mental effort, Efficiency.

Non-traditional students have a higher score (Table 6) on the multiple choice physiotherapy test (N = 75, M = 5.81, SD = 0.83) than the traditional students (N = 172, M = 4.99, SD = 0.65). This difference in score is significant (*t*(115) = -7.63, p < 0.01). Education (traditional/non-traditional) can explain 34% of the variance in the outcome of the multiple choice test; however, it did represent a large-sized effect r = .58.

There is a non-significant difference (t(217) = 1.56, p = 0.12) between traditional (N = 153, M = 6.20, SD = 1.07) and non-traditional (N = 66, M = 5.96, SD = 0.98) students on the experienced mental effort during the multiple choice test (see Table 6). Education (traditional/non-traditional) can explain 1% of the variance in the mean mental effort; however, it did represent a small-sized effect r = .11.

The efficiency of learning of traditional and non-traditional students was measured with Paas and Van Merriënboer's formula (1993). There is a significant difference (t(215) = -5.88, p < 0.01) between traditional (N = 151, M = -0.28, SD = 0.97) and non- traditional (N = 66, M = 0.58, SD = 1.05) students on the efficiency of learning (see Table 6). Education (traditional/non-traditional) can explain 14% of the variance in Efficiency of Learning; however, it did represent a medium-sized effect r = .37.

Table 6
Efficiency of Learning

		N	Mean	Std. Dev.	Std. Error Mean	t	Sig. 2-tailed
Performance	Traditional	172	4.99	0.65	0.05	-7.63	<0.01
	Non -traditional	75	5.81	0.83	0.10		
Mean mental effort	Traditional	153	6.20	1.07	0.09	1.56	0.12
	Non -traditional	66	5.96	0.98	0.12		
Efficiency	Traditional	151	-0.28	0.97	0.08	-5.88	<0.01
	Non -traditional	66	0.58	1.05	0.13		

Note. Performance theoretical minimum = 0, theoretical maximum = 10. Mental Effort theoretical minimum = 1, theoretical maximum = 9; Efficiency theoretical minimum = -1, theoretical maximum = 1.

Statistical analysis of 45 individual items of the MSLQ-ILS

The 45 individual items of the MSLQ-ILS questionnaire significantly (p ≤ .05) measure the difference in regulation of learning between traditional and non-traditional students Physiotherapy. The reliability analysis of these 45 items shows a Cronbach's alpha of .89. Compared to the MSLQ-ILS questionnaire of 88 items, which shows a Cronbach's alpha of .94, this is slightly lower, nevertheless still a reliable questionnaire. A factor analysis was performed; four factors were distinguished (explaining 41% of the variance). With a qualitative coding method the individual items were screened for mutual aspects. The mutual aspect for factor 1 was found and can be described as ‚the student who is consciously trying

to learn'. Factor 2 and 3 can be described as „motivation' and „integrating knowledge'. Factor 4 as „inquisitiveness, combined with enthusiasm'.

To discover if the new scale could be useful for further research, as a selection instrument or to predict academic success, a correlation analysis was performed. A strong correlation was found between the performance on the multiple choice test of the traditional and non-traditional students and the score on the 45 individual items (r = .42; p < .001; n = 150). For the non-traditional students a strong correlation was found between performance and the score on the new scale (r = .50; p < .004; n = 31), therefore the new scale could be used to predict academic success for this group. The correlation found for the traditional students is weak (r = .19; p = .044; n = 119) and so the new scale seems less usable for the traditional students.

Discussion

Regulation of learning

The Physiotherapy students (traditional and non-traditional) have the same personal characteristics as used by Jinkens (2009) in his research of this population. Most of the non-traditional students are 24 years or older (93%) and most of the traditional students are younger than 24 years of age (99%). Non-traditional students should be able to regulate learning better than the traditional students because of their age and their further development of the brain. The development of metacognitive skills, which are directed regulating the cognitive and affective learning activities (Vermunt, 1996), takes place in the frontal cortex, which develops in late adolescence (Jolles, 2007).

The first research question is addressed to the differences between traditional and non-traditional students in regulation of learning. Non-traditional students are better able to regulate their learning than traditional students in the areas of cognition, motivation, behaviour and context.

Cognition

In the area of cognition the non-traditional students Physiotherapy score significant higher on the scales of Elaboration, Critical Thinking and Metacognitive Self Regulation. These results support the research of Jacobsen and Harris (2008) who found significant differences on the same scales. Non-traditional students are better in storing information into long-term memory; in integrating new information with prior knowledge (Elaboration), they are better in applying previous knowledge to new situations (Critical thinking) and better in

planning, monitoring and regulating their activities (Metacognitive Self-Regulation) (Pintrich et al., 1991).

On the Rehearsal scale the traditional students score significant higher. Although the traditional students were scoring higher and this is a result in opposite direction to the findings of Jacobsen and Harris (2008) it was expected for these traditional students. The rehearsal scale involves basic rehearsal strategies like reciting or naming items from a list. These strategies are best used for simple tasks (Pintrich et al., 1991). Thus the scale of Rehearsal is reproducing orientated. Based on the findings of Ronning (2009) it is to be expected that traditional students score higher on the Rehearsal scale because they are more reproducing orientated.

On the Organization scale the non-traditional students score higher, but this is a non-significant difference. Jacobsen and Harris (2008) found the same, however with significant differences. Organization strategies help the learner select appropriate information and construct connections among the information to be learned (Pintrich et al., 1991). It seems that the traditional Physiotherapy students are just like the non-traditional students able to use these strategies in the same way. Perhaps this can be explained by the fact that all students follow the same classes and receive the same instructions.

Motivation

In the area of motivation the non-traditional students Physiotherapy score significant higher on the scales of Intrinsic Goal Orientation, Task Value, Self efficacy and Test Anxiety. These results support the findings of Jacobsen and Harris (2008), except for Self efficacy where no significant difference was found. Jinkens (2009) states that non-traditional students are more motivated because they have a specific reason to attend college. Traditional students are less serious, less motivated and need more encouragement (Jinkens, 2009). The non-traditional Physiotherapy students score significant higher on four of the six motivation scales.

On the scales Extrinsic Goal Orientation and Control of Learning Beliefs the traditional students score non-significant higher. A higher score on Extrinsic Goal Orientation was to be expected for the traditional student who is more focused on getting high grades and need more encouragement (Jinkens, 2009). Because of the non-significant difference the non-traditional Physiotherapy student might also be participating in a task for reasons as grades, and rewards just like the traditional students.

Control of Learning Beliefs handles the efforts of a student to learn and that this will result in positive outcomes. If students believe that their efforts to study make a difference in their learning they study more in appropriate ways (Pintrich et al., 1991). It was not expected that traditional students scored higher on this scale, it was expected that the non-traditional student would study more effectively.

The scale of Control of learning beliefs scored a moderate reliability (alpha = .58) for our sample. Pintrich et al. (1991) and Duncan & McKeachie (2005) found a reliability of .68 on the Control of Learning Beliefs scale in their researches using MSLQ. The difference in reliability can be explained by the differences in context, tasks and participants in which the researches are performed. The measured constructs are context dependent (Duncan & McKeachie, 2005). The scale Control of learning beliefs is not reliable and not discriminative for our sample of traditional and non-traditional Physiotherapy students.

Behaviour

In the area of behaviour the non-traditional students score significant higher on all three scales; Effort Regulation, Help Seeking and Self Regulation. The result for Effort Regulation supports again Jacobsen and Harris (2008) who found similar significant higher scores for non-traditional students. Effort regulation reflects how students try to regulate their effort and attention in the face of difficult, boring and uninteresting tasks (Pintrich et al., 1991; Pintrich, 2004). Self regulation reflects how students try to regulate their behaviour in terms of their effort. The result on Help Seeking is the opposite of Jacobsen and Harris (2008); they found significant higher scores for traditional students. It seems that the non-traditional Physiotherapy student is more willingly to ask other students or lecturers for help. A factor that may cause this difference could be that the non-traditional students are seeking help for more information because they have less study hours at university. It was expected that non-traditional students scored higher on Help Seeking. The non-traditional students scored significantly higher on performance and good students will seek help for assistance when necessary (Pintrich et al., 1991).

Non-traditional students have several activities next to their education, in order to manage all this, they have to acquire highly self regulated behaviour (Ronning, 2009). These results show that non-traditional students are better in regulating their behaviour than traditional students.

Context

In the area of context non-traditional students score significant higher on both scales; Time and Study Environment and Peer Learning. At the Academy of Health a student-centred approach is used. Students have influence on the context of their learning. Pintrich (2004) stated that students, who are able to regulate and influence their study environment, are better able to resist distractions. In a student-centred environment students need to be able to regulate their context. Despite their several activities and spending less time at campus, the non-traditional students are more able to regulate their context of learning. This might lead to more efficient management of time, study environment and the help of fellow students.

Differences between traditional and non-traditional students Physiotherapy were found significant on 13 of the 16 scales. These statistical results should be regarded with prudence, as social desirability is a factor that influences these results based on self-reported questionnaires like the MSLQ-ILS. The motivation and strategies of even the most self-regulated learner is dependent on the task and content (Duncan & McKeachie, 2005).

In his review of the MSLQ, Artino (2005) recommends to maintain the constructs and to keep the subscales as short as possible. The original MSLQ-ILS questionnaire existed of 99 items, with a Cronbach's alpha = .94. By deleting 11 items, the reliability of the individual scales raised, however the reliability of the whole questionnaire remained the same. For collecting data it can be recommended to use the MSLQ-ILS questionnaire with 88 items (Cronbach's alpha = .94).

The new scale with 45 items can be used for further research within this population. The new scale clearly defines the differences in traditional and non-traditional students Physiotherapy. These differences can be ascribed to the four factors in the 45 items, interpreted as the conscious attitude towards learning, motivation, elaboration and inquisitiveness. The non-traditional students score significantly higher on those factors.

The performance on the multiple choice test is strong correlated with the score on these 45 items. The new scale could be used as an instrument to select students for the non-traditional Bachelor of Health study programme of Physiotherapy and to predict academic success in non-traditional students. To be able to use the new scale for further research, it is recommended to develop the instrument.

Efficiency of learning

The second research question addressed to the differences between traditional and non-traditional students in efficiency of learning. As expected, the non-traditional students score

significant higher on efficiency of learning. It is recommended by Van Gog et al. (n.d.) to measure the mental effort repeatedly. The whole experienced mental effort is more than the sum of its parts.

Further research

This research was performed with freshman Physiotherapy students. One could hypothesize that the differences found in their first year will get smaller the next years. This expected decrease in differences could be observed in a longitudinal research: do these differences in regulation of learning and efficiency of learning remain or change over time. Mental effort is recommended to measure repeatedly as Van Gog et al. stated.

The differences found between traditional and non-traditional students are recommended for further qualitive research. Observations of students and in-depth interviews with students who are using different learning strategies while performing certain tasks are recommended.

<div align="center">

Conclusion

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The aim of this research was to discover if and in which aspects of regulation and efficiency of learning traditional and non-traditional students differ. The MSLQ-ILS questionnaire was found to be a reliable instrument for the sample being used. Differences between traditional and non-traditional students were identified on 13 of the 16 MSLQ-ILS scales. Reliability analyses as well as independent sample *t*-tests were performed to determine if the MSLQ-ILS questionnaire was appropriate for this sample population and to determine if differences between traditional and non-traditional students existed. The independent sample *t*-test confirmed the differences between traditional and non-traditional Physiotherapy students.

The first research question addressed to the differences between traditional and non-traditional students in regulation of learning. From the 16 scales of the MSLQ-ILS questionnaire 12 scales were found significant different in favour of the non-traditional students. Non-traditional students are better able to regulate their learning than traditional students in the areas of cognition, motivation, behaviour and context.

In the area of cognition the non-traditional students Physiotherapy score significant higher on the scales of Elaboration, Critical Thinking and Metacognitive Self Regulation. On the scale of Rehearsal the traditional students score significant higher.

There is also a significant difference in favour of the non-traditional student in the area of motivation. The non-traditional students score significant higher on four out of the six

scales (Intrinsic Goal Orientation, Task Value, Self efficacy and Test Anxiety), therefore it can be concluded that non-traditional students need less encouragement and are more motivated than traditional students.

The non-traditional students are significantly better able to regulate their behaviour of learning; in the area of behaviour the non-traditional students score significant higher on all three scales; Effort Regulation, Help Seeking and Self Regulation.

In the area of context non-traditional students score significant higher on both scales; Time and Study Environment and Peer Learning.

The second research question addressed to the differences between traditional and non-traditional students in efficiency of learning. The non-traditional students scored significantly higher on performance. They scored a lower mental effort during the test than traditional students, which is a non-significant difference. Finally the efficiency of learning, measured by the formula of Paas and Van Merriënboer (1993), was found significantly higher in favour of the non-traditional students. Non-traditional students learn more efficient than traditional students, although non-traditional students don't show a significant lower mental effort.

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Appendix 1 MSLQ-ILS questionnaire

Note 1:   Items in red are the deleted items for a better Cronbach's Alpha.

Note 2:   Items in green are the seven previous deleted items, based on reliability analysis by Cronbach's alpha, which were included again based on the *t*-test analysis of the individual items.

Note 3:   Items marked with * significantly (p ≤ .05) measure the difference between traditional and non traditional students Physiotherapy.

1.	Intrinsic Goal Orientation (MSLQ)	
	Variabele	Vraag
1.	I01_Intr*	Bij dit leerpakket wil ik graag een uitdagend leerboek zodat ik nieuwe dingen kan leren.
2.	I16_Intr	Bij een leerpakket heb ik het liefst een leerboek dat mij nieuwsgierig maakt, ook al is de stof moeilijk.
3.	I22_Intr*	Ik vind het fijn om de stof van dit leerpakket helemaal te begrijpen.
4.	I24_Intr*	Als ik de kans krijg, kies ik onderwerpen waar ik iets van leer, zelfs als dat betekent dat ik een minder goed cijfer haal.

2.	Extrinsic Goal Orientation (MSLQ)	
	Variabele	Vraag
5.	I07_Extr	Op dit moment is het mij heel wat waard om een goed cijfer te halen voor dit leerpakket.
6.	I11_Extr	Ik ben er wel op uit een zo hoog mogelijk cijfer te halen.
7.	I13_Extr	Ik wil graag beter zijn dan de gemiddelde leerling.
8.	I30_Extr	Ik wil anderen graag laten zien dat ik in staat ben dit leerpakket met succes te volgen.

3.	Task Value (MSLQ)	
	Variabele	Vraag
9.	I04_Tskv*	Ik denk dat wat ik leer in de specifieke leerpakketten, ook kan gebruiken bij andere leerpakketten.
10.	I10_Tskv	Het is voor mij belangrijk om te leren wat er in de lessen aan bod komt.
11.	I17_Tskv	Ook door de opdrachten en het huiswerk, ben ik heel geïnteresseerd in waar dit leerpakket over gaat.
12.	I23_Tskv	Ik denk dat wat ik leer tijdens dit leerpakket handig is voor mij om te weten.
13.	I26_Tskv	Ik vind de opdrachten die ik voor dit leerpakket moet doen leuk.
14.	I27_Tskv*	Begrip van de onderwerpen in de leerpakketten is belangrijk voor mij.

4.	Control of Learning Beliefs (MSLQ)	
	Variabele	Vraag
15.	I25_Cont	Als ik de stof niet begrijp komt dat omdat ik te weinig moeite heb gedaan.
16.	I09_Cont	Als ik dit leerpakket niet haal, ligt dat in de eerste plaats aan mezelf.
17.	I18_Cont	Als ik mij inspan, lukt het mij wel de stof te begrijpen.
18.	I02_Cont	Als ik op de goede manier studeer, krijg ik de stof van dit leerpakket wel onder de knie.

5.	Self efficacy for Learning and Performance (MSLQ)	
	Variabele	Vraag
19.	I05_Slfef	Ik denk dat ik dit jaar goede cijfers ga halen voor dit leerpakket.
20.	I06_Slfef*	Ik heb wel er vertrouwen in dat ik de teksten die we voor dit leerpakket moeten lezen - hoe moeilijk ze ook zijn - kan begrijpen.
21.	I12_Slfef*	De basisbegrippen van dit leerpakket krijg ik in elk geval onder de knie.
22.	I15_Slfef	Ik vertrouw erop dat ik ook de ingewikkelde onderwerpen die de docent aan de orde stelt , kan begrijpen.
23.	I20_Slfef	Ik ben vol vertrouwen dat ik mijn opdrachten en toetsen heel goed ga maken.
24.	I21_Slfef	Voor dit leerpakket haal ik gemakkelijk een voldoende, verwacht ik.
25.	I29_Slfef	Ik weet zeker dat ik de vaardigheden die je bij dit leerpakket leert, ga beheersen.
26.	I31_Slfef*	Wanneer ik kijk naar de eisen van dit leerpakket, naar de leraar en naar wat ik al kan en weet, dan weet ik zeker dat ik het haal.

6.	Test Anxiety (MSLQ)	
	Variabele	Vraag
27.	I03_Tanx_i*	Wanneer ik een toets maak, denk ik altijd hoe slecht ik het doe in vergelijking met andere studenten.
28.	I08_Tanx_i*	Wanneer ik met een toetsvraag bezig ben, moet ik er steeds denken dat ik andere vragen misschien niet weet.
29.	I14_Tanx_i*	Als ik een toets maak, denk ik altijd aan wat er gebeurt als ik hem niet haal.
30.	I19_Tanx_i	Tijdens een toets ben ik altijd opgelaten en onrustig van binnen.
31.	I28_Tanx_i	Ik heb last van de zenuwen als ik een toets maak.

7.	Rehearsal (MSLQ)	
	Variabele	Vraag
32.	I72_Reh*	Ik maak lijsten van de belangrijke definities en leer die uit mijn hoofd.
33.	I46_Reh	Als ik voor dit leerpakket leer, kijk ik de stof en mijn aantekeningen vaak door.
34.	I59_Reh*	Om de belangrijkste begrippen van het leerpakket onder de knie te krijgen leer ik definities uit mijn hoofd.
35.	I39_Reh	Ik herhaal de belangrijkste onderdelen van de studiestof net zo lang tot ik ze uit mijn hoofd ken.

8.	Elaboration (MSLQ)	
	Variabele	Vraag
36.	I53_Elab*	Studeren voor dit leerpakket betekent voor mij dat ik informatie uit verschillende bronnen, zoals lesaantekeningen, leerboeken en discussies, verzamel en integreer.
37.	I62_Elab*	Ik verbind de informatie in dit leerpakket met informatie uit andere leerpakketten.
38.	I64_Elab*	Wanneer ik iets lees voor dit leerpakket, zoek ik naar verbindingen met wat ik al weet.
39.	I67_Elab	Als ik leer voor dit leerpakket maak ik samenvattingen van de centrale punten uit het leerboek en uit mijn aantekeningen.
40.	I69_Elab*	Ik begrijp de stof beter door wat we moeten lezen in verband te brengen met wat de leraar heeft verteld.
41.	I81_Elab	Ik gebruik de leerstof uit het boek bij andere lesactiviteiten, zoals een discussie of een spreekbeurt.

9.	**Organization (MSLQ)**	
	Variabele	Vraag
42.	I32_Org	Bij het lezen van de stof voor dit leerpakket onderstreep ik om mijn gedachten te kunnen ordenen.
43.	I42_Org*	Wanneer ik leer voor dit leerpakket neem ik door wat ik gelezen en opgeschreven heb en probeer ik het belangrijkste eruit te halen.
44.	I49_Org	Ik maak schema's, overzichten en tabellen om de stof te ordenen.
45.	I63_Org	Als ik leer voor dit leerpakket, loop ik mijn aantekeningen na en maak ik een overzicht van de belangrijkste begrippen.

10.	**Critical thinking (MSLQ)**	
	Variabele	Vraag
46.	I38_Crit*	Ik merk dat ik me bij dit leerpakket vaak afvraag of ik de dingen die ik lees of hoor wel overtuigend vind.
47.	I47_Crit*	Zodra er een theorie, interpretatie of conclusie wordt gepresenteerd bij dit leerpakket, vraag ik me af of die wel voldoende onderbouwd is.
48.	I51_Crit*	Ik zie dit leerpakket als een vertrekpunt om mijn eigen visie te ontwikkelen.
49.	I66_Crit*	Over wat ik aan het leren ben, formuleer ik ook mijn eigen denkbeelden.
50.	I71_Crit	Steeds al ik bij dit leerpakket een stelling of conclusie hoor, bedenk ik of je ook iets anders kunt beweren.

11.	**Metacognitive Self-Regulation (MSLQ)**	
	Variabele	Vraag
51.	I33_Mcg_i*	Tijdens de les mis ik vaak belangrijke punten omdat ik met mijn gedachten ergens anders ben.
52.	I36_Mcg	Wanneer ik lees voor dit leerpakket, bedenk ik vragen om mijn aandacht erbij te houden.
53.	I41_Mcg*	Wanneer ik niet zeker ben van iets dat ik aan het lezen ben voor deze les, danÂ probeer ik dit uit te zoeken en toch te begrijpen.
54.	I44_Mcg*	Wanneer lesmateriaal moeilijk te begrijpen is dan verander ik de manier waarop ik het materiaal lees.
55.	I54_Mcg*	Voordat ik een nieuwe tekst ga lezen, bekijk ik eerst hoe de tekst is opgebouwd.
56.	I55_Mcg	Ik stel mijzelf vragen om zeker te weten dat ik het materiaal dat ik voor deze les gelezen heb snap.
57.	I56_Mcg	Ik pas mijn studiemethoden aan aan de eisen voor het leerpakket.
58.	I57_Mcg_i*	Het overkomt me geregeld dat ik iets heb gelezen voor dit leerpakket en dat ik niet echt begrijp waarover het gaat.
59.	I61_Mcg	In plaats van domweg te lezen, denk ik eerst over een onderwerp na en bekijk wat ik ervan zou moeten leren.
60.	I76_Mcg*	Als ik zit te leren zoek ik uit welke begrippen ik nog niet goed door heb.
61.	I78_Mcg	Ik stel voor mezelf regelmatig doelen vast om zo mijn leerwerk voor dit leerpakket te plannen.
62.	I79_Mcg	Als ik tijdens de les mijn aantekeningen onduidelijk vind, zoek ik het na de les meteen uit.

12.	Time/Study Environmental Management (MSLQ)	
	Variabele	**Vraag**
63.	I35_Tsdy*	Meestal zit ik te leren op een plek waar ik me kan concentreren.
64.	I43_Tsdy	Bij dit leerpakket ga ik efficient met mijn eigen tijd om.
65.	I52_Tsdy_i*	Ik vind het moeilijk me aan een planning te houden.
66.	I65_Tsdy	Ik heb een vaste plek gereserveerd om te kunnen studeren.
67.	I70_Tsdy	Ik zorg ervoor dat ik op tijd alles gelezen heb en de opdrachten gemaakt heb.
68.	I73_Tsdy*	Ik volg de lessen regelmatig.
69.	I77_Tsdy_i	Ik ervaar dat ik niet heel veel tijd aan deze leerpakket besteed vanwege andere activiteiten.
70.	I80_Tsdy_i	Ik vind nauwelijks de tijd om mijn aantekeningen en de lesstof door te nemen voor het toetsen.

13.	Effort Regulation (MSLQ)	
	Variabele	**Vraag**
71.	I37_Eff_i*	Ik verveel me vaak zo als ik voor dit leerpakket zit te leren, dat ik eerder ophoud dan ik van plan was.
72.	I48_Eff	Ik werk hard voor dit leerpakket ook al interesseert het me niet echt wat er behandeld wordt.
73.	I60_Eff_i*	Als de stof me niet interesseert, houd ik er mee op of doe ik alleen de gemakkelijke stukken.
74.	I74_Eff*	Ook als de stof saai is, maak ik mijn werk af.

14.	Peer Learning (MSLQ)	
	Variabele	**Vraag**
75.	I50_Prlrn*	Als ik zit te leren voor dit leerpakket, helpt het me om met klasgenoten over de stof te praten.
76.	I45_Prlrn	Als het kan, werk ik met andere leerlingen samen bij het maken van de opdrachten.
77.	I34_Prlrn*	Omdat ik het dan zelf beter ga begrijpen, probeer ik de leerstof wel eens uit te leggen aan een vriend(in) of klasgenoot.

15.	Help Seeking (MSLQ)	
	Variabele	**Vraag**
78.	I40_Hsk_i	Zelfs wanneer ik moeite heb met het bestuderen van het lesmateriaal in de les, probeer ik toch alleen te werken zonder de hulp van anderen.
79.	I58_Hsk	Als ik definities niet begrijp, vraag ik aan de leraar die nog eens uit te leggen.
80.	I68_Hsk*	Als ik de stof niet begrijp vraag ik het aan een andere leerling.
81.	I75_Hsk*	Ik probeer uit te zoeken welke klasgenoten ik om hulp kan vragen.

	16. Selfregulation (ILS)	
	Variabele	Vraag
82.	I82_Selfreg1*	Als docenten proeftentamens met de goede antwoorden geven, ga ik na of ik de leerstof beheers.
83.	I83_Selfreg2	Voordat ik aan een nieuw leerstof onderdeel begin, denk ik eerst na hoe ik dat het best kan bestuderen.
84.	I84_Selfreg3	Als ik moeite heb met een onderdeel uit de leerstof, probeer ik te analyseren waarom dat moeilijk voor me is.
85.	I85_Selfreg4*	Als ik een stuk leerstof niet goed begrijp, zoek ik er andere literatuur bij over dat onderwerp.
86.	I86_Selfreg5*	Ik zoek uit mezelf naar verbanden met de leerstof.
87.	I87_Selfreg6*	Ik probeer zelf voorbeelden te bedenken bij de leerstof.
88.	I88_Selfreg7*	Om te controleren of ik de studiestof goed beheers probeer ik zelf de hoofdzaken ervan in mijn eigen woorden te formuleren.
89.	I89_Selfreg8_i*	Als ik hulp of uitleg nodig heb, vind ik het moeilijk om naar een docent toe te stappen.
90.	I90_Selfreg9_i*	Als ik een vraag heb over de leerstof, vind ik het akelig om die in het college te stellen.
91.	I91_Selfreg10_i	Mij is niet duidelijk wat ik moet onthouden en wat niet.
92.	I92_Selfreg11_i	Ik vind het moeilijk om vast te stellen of ik de leerstof voldoende beheers.
93.	I93_Selfreg12	Ik werk met een activiteitenlijstje.
94.	I94_Selfreg13	Mijn planningen noteer ik op schrift.
95.	I95_Selfreg14	Ik plan ook mijn andere activiteiten, zoals sport, hobby\'s, uitgaan, film e.d.
96.	I96_Selfreg15	Ik kan mijn tempo van studeren vrij realistisch inschatten.
97.	I97_Selfreg16	Ik plan mijn activiteiten zo royaal dat ik ruimschoots op tijd klaar ben.
98.	I98_Selfreg17_i	Ik heb er moeite mee mijn planningen ook uit te voeren.
99.	I99_Selfreg18	Dankzij mijn planningen ben ik bijtijds klaar met de voorbereidingen van mijn toetsen.