A Diary Study of Students' Classroom Learning And Motivation

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Abstract

Quantitative research in motivation has usually used measures taken outside the context of students' actual learning activities. This study, however, maintains that students' motivation and learning are situated. The paper reports a study that utilises a diary as a research tool to assess students' learning and motivation in context. A class of high achieving students (N=34) kept a lesson diary for 6 weeks about their mathematics lessons. It was found that high achieving students used learning related self-structures to assess the lessons. These learning self-structures mainly include efficacy belief, mastery, interest and self-regulation. Based on students' comments in the open diaries, students' ratings of various motivational constructs in the structured diaries were classified into motivating, unmotivating and neutral groups. ANOVA Tests with Scheffe Post Hoc Tests confirmed that students would show difference in motivation when they perceived a lesson as motivating versus unmotivating. A subsequent discriminant analysis showed that mastery goal, task value and mastery oriented learning climate were the three most important predictor variables that discriminated motivating lessons from unmotivating lessons. The significance of this study is that it provides a theoretical framing that sees motivation not as a static trait but as a

process. It also demonstrates initial evidence for the validity of a situated approach to classroom learning and motivation. Further effort is needed to validate the findings with students having diverse learning characteristics and achievement history, using other data collection design as keeping a diary was proved to be ineffective among low achievers.

A Diary Study Of Students' Classroom Learning And Motivation

Educational researchers and psychologists have extended considerable effort in identifying the intra-physic and environmental variables that influence students' motivation to learn (for a review Schunk, 1990; Pintrich & Schunk 1996; Wigfield, Eccles, & Rodriguez, 1998). More often than not, these variables have been measured outside the context of students' actual learning activities. Building on the notion of situated motivation developed by Paris & Turner (1994), this paper investigate students' learning and motivation in a mathematics classroom from a situated approach, which emphases that motivation is to be understood as a process by which an individual self-system interacts with the external classroom environment.

Research in Motivation: Intra-psychic Variables

Weiner (1990) in the review of history of motivation in education pointed out that the main theories in motivation in education are based on interrelated cognitions of causal aspirations, efficacy and control beliefs, helplessness and thought about goals one strives for. These interrelated cognitions mainly include the research concentrations in attribution (e.g. Weiner, 1985), intrinsic and extrinsic motivation (e.g. Deci & Ryan, 1985), self-efficacy (e.g. Schunk, 1991; Pajares & Miller, 1994), self-determination (e.g. Ryan & Powelson, 1991), interest (e.g. Schiefele, 1991), subjective task values (e.g. Wigfield & Eccles, 1992), goal orientations (e.g. Ames, 1992; Dweck, 1986), and self-regulation (e.g. Zimmerman & Pons, 1996) (for an updated review, please see Wigfield, Eccles, & Rodriguez,1998). Although researchers in these fields tend to emphasise a particular dimension of motivation over another, motivation, in a general sense, is often conceptualised as intra-psychic states, personal traits, or beliefs and attitudes, residing internally within a self-system (Wigfield, Eccles, & Rodriguez, 1998). Research efforts in these fields are effective in identifying generalised principles that guide and predict students' learning motivation. It is believed that these generalised principles are context-free and can be applied to diverse learning contexts.

Nevertheless, the strength of these research fields also begets their weakness. Researchers in these fields are skilful in developing generalised principles that predict students' motivation. Their research, however, often fails to capture the dynamics and fluidity of motivation in a specific situation, like doing a classroom task. In addition, their research

designs often brush aside the notion that the individual is a unique psychological system within which different dimensions of cognitions, emotions and behavioural manifestations interact in a complex manner. Bong (1996) in analysing the problems in the research of academic motivation maintained that there was a lack of a comprehensive motivation model and 'no single model can capture the full dynamics of motivated behaviors'. Recently, researchers have begun to address these shortfalls (e.g. Wolter, Yu, & Pintrich, 1996; Young, 1997).

Research in Motivation: Classroom Environment

Ever since Rosenthal & Jacobson's research on the 'Pygmalion effect' in classroom learning in 1960's, there has been consistent effort to that understand students' motivation from an external perspective. The external environments may range widely, varying from the physical, like a classroom, to social and cultural constructions. In general, these research efforts conceptualise students' motivation not as a pure internal property. The external environments, to a different degree, will affect students' motivation to learn. The focus of these research concentrations is in locating ways that external environments can be manipulated in order to facilitate the development of students' motivation. For example, Ames (1984) studied three classroom structures, cooperative, competitive and individualistic, that would affect students' motivational goals and learning patterns. More recently, goal orientation theorists (e.g. Ames, 1992; Blumenfeld, 1992) have advocated the development of a mastery learning environment so as to facilitate the development of adaptive mastery learning goals among students. Self-determination theorists (e.g. Ryan, Connell, & Deci, 1985; Skinner, & Belmont, 1993) have also singled out three crucial environmental variables, support for autonomy, support of competence and support for care and warmth, that could facilitate the development of students' autonomy.

In general, these research efforts in the external environment have been successful in understanding the effects of a facilitating versus a threatening environment on students' learning and motivation. Nevertheless, with the exception of self-determination theory, the role of the self has not been explicitly dealt with in the research of these fields. As such, motivation is becoming more like an environmental property external to the self-system. Carried to an extreme, this may be verging on a behaviouristic approach to motivation, rigidly and unintentionally, advancing a reductionist belief that the manipulation of the external environment will lead to high motivation and good learning results. Jussim (1986) in reviewing the research in teachers' expectancy effects argued that more attention should be given to understand how the self has modified and mediated the external teacher effects on their learning.

Situated Motivation

The brief discussion above exposes some conceptual inadequacies of research in motivation from an intra-psychic and an environmental perspective respectively. This paper adopts the notion of situated motivation, which is believed to be capable of addressing these conceptual inadequacies, to study students' classroom learning and motivation.

Paris & Turner (1994) theorised that situated motivation has four characteristics:

a/ motivation is a consequence of the cognitive assessments that an individual provides in situations;

b/ cognitive interpretations of events are constructed, which means that they are open to distortion;

c/ motivation is necessarily contextualised because individuals create unique cognitive interpretations of events, goals, and probabilities in different situations;

d/ situated motivation is necessarily unstable.

In short, Paris and Turner's idea of situated motivation emphasises individual's cognitive assessment of a situation, which renders motivation an unstable construct. However, they did not explain how the cognitive assessment is made and what kind of processes will be involved. Neither did they explain in details how events were constructed or distorted by an individual. Building on this skeletal conceptualisation, I attempt to further the notion of situated motivation and provide empirical supports for its validity.

Like Paris and Turner, I maintain that situated motivation relies heavily on understanding how an individual assesses a situation. The assessment of a situation means that an individual needs to summon certain self-information that is relevant to the situation in order to assess it more effectively. The problem lies with what type of self-information will be summoned. For students in a mathematics lesson, expectably, it is common for self-structures like problem solving ability, competence beliefs, and interest in the task to be summoned. For players in a basketball match, self-information related to their physical fitness and motor skills will be more ready to be available. In other words, a situation will determine which self-structure is more relevant. The specificity of a situation will make certain self-structures more readily available than other.

Another variable that may have an effect in determining which self-structures will be summoned for assessing a situation, lies within the self-system. Individual with well developed self-structures related to a certain domain will probably be more effective in assessing a situation related to the domain that they are familiar with than people who do not have such established self-structures. (Markus, 1977; Markus & Nurius, 1987).

Following the self-situational assessment, an individual makes a decision about their action and response. This assessment and decision-making process is basically cognitive. Having said that, it needs to be pointed out that it does not preclude emotional and physical variables come into play during this assessment process. More often than not, variables like mood and body condition will seriously influence the cognitive processes.

Implied in the situated motivation perspective is that there is no objective situation as such. In other words, there is no such a thing called 'a motivating lesson' or 'an unmotivating lesson' in an objective sense. Whether a situation or a task is motivating or not depends on the assessment of an individual, which in turn is determined, by and large, by the internal configuration of an individual, more specifically the type of self-structures salient at the moment of judgment.

Motivation from a situated perspective is not a trait or a state within a self-system. It is, in essence, a process which involves a complex interaction between a self-system and an external environment anchored in a situation. This motivation process is characterised by instability and dynamics. While distinctive interaction processes can be identified, predictability or locating generalised principles is not the main thrust of this theoretical understanding of classroom motivation.

Putting this concept into education or students' learning in the classroom, it means that students are active constructors of classroom tasks. Task and classroom atmosphere are constructed and interpreted in the light of the salient self-structures in one's mind. Every lesson is then a new learning situation that students will perceive afresh from their specific internal configuration or the salient self-structures.

The Methodology

This study employs the situated motivation concept to study students' learning and motivation in a mathematics classroom. The focus is on understanding how students assess learning and motivation in a lesson. The main research questions are

a/ how do students perceive their mathematics lessons?

b/ what kinds of self-structures are salient in the assessment of learning activities in a lesson?

c/will students show motivational differences in lessons they perceived as motivating versus those they identified as unmotivating?

In order to study students' classroom learning and motivation from a situated approach, it is important that students are given the chance to assess their own motivation with regard to a specific lesson. A lesson diary can serve this purpose well. Students are asked to keep a diary of their mathematics lessons for six weeks from May to early June this year.

There are two parts in the diary, an open diary and a structured diary. The open diary allows students to assess and reflect on their learning. Students were encouraged to put whatever they considered relevant into the open diary. The structured diary helps students make judgements of their motivation qualities with regard to the classroom task and the lesson as a whole.

The structured diary contained 30 items which allowed students to assess their own learning goals, task value, perceived efficacy, learning environment and self-regulatory strategies. The response items were written in a way that students were assessing these motivational constructs in relation to a lesson.

Mastery goal, functional goal, social solidarity goal and efficacy belief were each measured by one item. Performance goal was measured by two items, which had a reliability alpha of .80. Task value was measured by three items, with reliability alpha of .83. Mastery learning climate was measured by three items, with a reliability alpha of .82. Performance learning environment was measured by 3 items, with reliability alpha of .65. Self-regulation was measured in three separate stages, the beginning of the lesson, during the lesson and at the

end of the lesson. The reliability alpha for these three self-regulation constructs were .50 (3 items), .78 (4 items) and 81 (3 items) respectively.

In order to encourage students to fill in the diary, each was given a personal code number by which they identified themselves in the diaries. The teacher would allow time for students to fill in the diaries at the end of each lesson. In other words, writing the diary became a routine of this mathematics class. However, it still depended on students' initiative and persistence to complete the diaries. The diaries were collected at the end of every fifth mathematics lesson.

The participants

A class of high achieving year 10 students (N=34), who has participated in an earlier survey study that investigated the relationship among motivation, strategies and outcomes, was asked to keep the diaries for four to six weeks. Each student was given four sets of diaries. In total, 84 diary sets were collected at the end of the data collection period. Among the returned diaries, 359 entries were valid for analysis and interpretation.

In the original design, a class of high achieving and a class of low achieving students were asked to keep the diaries. However, it has been especially difficult to get low achieving students to keep the diaries. Among the low achieving students, 3 out of 24 handed back part of their diaries. The high achieving students were more persistent in keeping the diaries.

Analysis & Result

Analysis I: Open Diaries

The analysis of the open diaries takes an interpretative orientation. Diary comments were interpreted from the learner's perspective. In this sense, there is no objective measure of how motivating each lesson was as each student would interpret a lesson from his or her own perspective. The emphasis in this analysis is on how individual student interpreted the lessons or the tasks.

In order to understand how students perceived their lesson and from what self-vantagepoints they were perceiving, I scanned through the diaries and developed a simple coding scheme from the data for categorising students' comments.

An abundance of evidence in the diary entries corroborated that students interpreted the lessons and tasks using their own self-structures, which led to two apparent outcomes; first, students in the same lesson reported disparate, and sometimes contradicting, views about the lesson; for example, in the lesson diary attached in Appendix 1, student M133 thought that the lesson on 20 May was a waste of time while student M118 commented that the lesson was good and enjoyable and the task was challenging. M113 disliked the lesson, as he has learnt nothing new. M118 liked it for she loved the topic. These contrasting views showed how students using different self-structures interpreted lesson and task, which resulted in contrasting comments.

The second notable outcome was that students perceived each lesson afresh and therefore their perceptions of the lesson task varied with lesson. Appendix 2 presents the comments of student M118 regarding to all the lessons she attended. For example, on 20 May, she commented that she enjoyed the lesson as she loved factorisation. Surprisingly she commented unfavourably about a lesson on 10 June, which ironically was also about factorisation, the topic she loved. She was so bored that she spent the lesson in drawing cartoons. However, it was not the topic that put her off. Rather it was because of her perception that she needed a break after the week long examination.

The disparate comments within a lesson and the variation of individual comments with lesson can be explained by the fact that students were perceiving each lesson with their own self-structures, which include mainly efficacy, mastery, self-regulation and interest. Table 1 shows the frequency of these self-structures appeared in students' diary comments

Table 1: Categories of Diary Comments

Categories of comments	Wholly about	Partly related	Total	% against total diary entries (N=359)
Efficacy	56	60	116	32%
Mastery	29	56	85	23.6%
Self-regulation	22	41	63	17.5%
Interest	41	46	87	24%

Usefulness	5	1	6	1%
Comparison	7	22	29	8%
Other selves	24	20	44	12%
No reference	35	0	35	9%

Efficacy, mastery and interest were the most important self-structures that students would summon when they reflected on their lesson. In other words, students asked themselves if they had the ability to do the task, if they understood the lesson and if they liked the task at hand. These structures are the most relevant self-information one would seek to assess classroom learning. More often than not, students would provide reasons to explain their efficacy belief, mastery and interest. Note that how these self-structures have led students to interpret the lesson or the task in the following sample comments.

efficacy:

- Did hard questions but they were easy. I must study. (M119, 22 May)

- Today's lesson was easy and if there were fewer questions in the textbook, I would have finished quite fast. I was able to do most of the questions with minimum effort and complete understanding. It was good to review the work that we haven't done for a while. (M123, 19 May)

Mastery

- This lesson got my mind pacing again. I love doing algebra because it's a challenge and it may seem weird but I view it's kind of fun! (M110, 8 May)

- This lesson was fairly good as I did my homework the night before so I understood what we were doing. (M103, 19 May)

- I understood what we were doing today because I have started to do my revision. (M103, 29 May)

Interest

- I found this lesson to be rather boring as there was not much to do. This may have something to do with the fact that I didn't have a map I needed. (M111, 7 May)

- I'm glad we are doing algebra revision. I liked it that much that I'm on the last question that we were assigned to do. I could do these all day. OK, maybe not all day! Today, I feel really focused. I like it when I'm focused. Helps me come into a good mood (M129, 1 June)

- More advanced quadratic equations. Was very interesting; posed a good challenge. (M105, 12 June)

Students also engaged in self-regulatory process when they wrote their diaries. These self-regulatory reflections were found usually before the semester examination. Students tried to check if they had learnt enough and from that they determined if additional practice and exercises were needed. They also assessed their performance against their own goals. The following diary entries show this type of assessment process.

- Today's lesson was most thought-provoking. Lots of misunderstanding and confusion, mainly because it's new to me. Must do some homework or else. (M110, 11 June)

- Today's lesson went well I was able to do most of my work and get most of my answers right. Some things I couldn't do however I got the majority right. I will try and finish my Revision sheets tonight because the exams on Friday and I need the practice. (M115, 2 June)

Students' diary entries also showed that they personalised the lesson tasks. In other words, they did not just perceive a task as an objective lesson component external to their selves. Rather, lesson tasks were assessed with specific self-serving purposes. In general, three

different types of task personalisation processes were notable: Task as a self-reinforcer; task as a self-regulator; and task as a self-evaluator.

a/ task as a self-reinforcer:

Students perceived a task at hand from their own self-efficacy beliefs. The task was taken as a chance to reinforce the understanding of their ability. For example, in the following two entries, students stated that whether the task was challenging or difficult. They also stated that whether they had the ability to finish the task. Students saw the task as a way to reinforce their current self-understanding.

- Revision again - it was really good because I knew how to do everything. (M126, 29 May 1998)

- It was revision and doing some graphing. I was confident, since I have revised my workings, this week. (M116, 4 June)

- It's okay. I know how to do them now. So I guess the lesson was okay. (M111, 10 June)

b/ Task as a self-regulator

Students also treated a lesson task as a means to regulate learning. For example, student M113 and 115 after doing the revision sheets concluded that extra practice was needed in order that they might be prepared for the examination. Usually when students self-regulated themselves using a lesson task, follow-up actions would come along.

- Our teacher says our whole class should do really well on the test this Friday. As the revision sheet is fairly easy. Well, I know I still need to find extra material to practise for this test. (M113, 1 June)

- Today's lesson went well I was able to do most of my work and get most of my answers right. Some things I couldn't do however I got the majority right. I will try and finish my Revision sheets tonight because the exams on Friday, and I need the practice. (M115, 2 June)

- I'm trying real hard to understand the revision sheet. I've got to work really hard. (M129, 4 June)

c/ Task as a self-evaluator

In this case, a lesson task was used as a means to evaluate one's own understanding of the subject matter being taught. Alternatively, students would use a task to evaluate their own ability and ability in relation to other students.

- It was a good revision. It made me to test myself, and find my errors. Overall, it was a practical lesson and I'm happy I wasn't absent! (M116, 29 May).

- Cross method. Um pretty good. I don't think I should stay in this class. I think I should go down. (M119, 10 June)

- We are doing the cross thing of factorise. It was really hard to understand, but I'm smart. (M130, 22 May)

The analysis above shows how students used their learning related self-structures to interpret their lesson experiences. However, these self-structures would sometimes give way to other more pressing concerns, like bad mood, tired body, and examination pressure. The following diary entries show that students brought along other concerns and contexts into the lessons. These concerns, in most cases, distracted students from engaging in a lesson.

- I was pretty distracted today because it's my birthday. (M102, 25 May)

- I felt very very bad. Because I just had a science test and I reckon I did very bad because I couldn't remember any of the work I studied the night before. So I did basically nothing in maths. (M107, 2 June 1998)

- Today's lesson was basically the same as yesterday's. For we're working on our revision sheet. I was mad at someone today. So since my mind was on that, I wasn't really concentrating on my work and was slow at finishing it. (M113, 2 June)

- I was feeling weird. I had butterflies in my stomach because today we start inter school sport and I'm doing Rugby League as a dummy half. I did some work but not too much. (M107, 3 June)

Discussion

The findings of open diary analysis supported that classroom motivation is a self-situation interaction process by which self-structures are summoned for assessing a learning task and making decision with regards to the mode of engagement. The self-structures, efficacy, mastery, interests and self-regulation can be understood as the key dimensions of a classroom learning self, which are in harmony with the self-schema construct suggested by Garcia and Pintrich (1994). When students are put into a learning situation like a classroom or a lesson, these self-structures will become salient. Often these self-structures will be likely to be used for assessing a task and a lesson. In such a way, a task is often personalised for various self-servicing purposes, which may include reinforcing one's ability belief, evaluating mastery and regulating learning in and after a lesson. On the other hand, the non-learning concerns represent students' "other selves" in the classroom. These "other selves" will often interfere with learning process during a lesson.

Nevertheless, as the current research used a biased sample, it lacks evidence that students with varying performance levels and achievement history will engage in the same kind of motivational processes involving similar learning self-structures. Most probably, low achieving students may lack such a learning self or do not have well-developed learning related self-structures which enable them to engage in these motivational processes effectively (Ng, 1998).

Analysis II: Structured Diaries

In order to answer the question if students distinguished motivating lessons from unmotivating lessons, students' structured diaries were classified into three groups according to their comments in the corresponding open diaries. Students' comments in the open diaries can be interpreted as students' general assessments of the lessons. Students who put favourable comments in the open diary were expected to score high in the motivational constructs in the structured diary. On the contrary, students who commented unfavourably about a lesson would be expected to rate themselves relatively lower in the structured diary. Accordingly, students' structured diary entries were classified into motivating and unmotivating lessons. Comments that could not be classified into these two groups were rated as neutral. The following are the examples of the favourable, unfavourable and neutral comments.

Table 2: A Sample of Favourable, Unfavourable and Neutral Diary Comments

Sample of favourable open diary comments:

- I liked the work. It was quite challenging.(M118, 28 May)
- I did well, we had a mini test with about 15 questions and out of 11 of them I got 8, so I was pleased. (M115, 25 May)

Sample of unfavourable open diary comments

- We have to do lots exercise of this lesson make me feel bored. (M130, 9 May)
- We did revision on Ratio. I hate ratios. (M111, 25 May)

Sample of neutral open diary comments

- Today the teacher discussed our maths test. She also gave us some questions to revise. (M104, 25 May)
- Today's lesson was still revision with application of new studies same as yesterday.(M105, 20 May)

To compare students' ratings of the motivational constructs in the structured diaries, which have been grouped into motivating and unmotivating from their own perspectives, one-way analyses of variance (ANOVAS) were used to test the differences among these two groups of lessons. Scheffe Test, a stricter statistical procedure than the usual Turkey Honestly Significant Difference Test (HSD), was chosen to test the Post Hoc differences of how students rated their motivation in these two groups of lessons. Table 3 presents the results of these comparisons.

Table 3: ANOVA Comparisons of Group Means

Structured Diary Variables	Unmotivating group	Motivating group	F (1, 269)
mastery goal	3.70	4.34	33.18***
performance goal	3.91	4.20	9.51*
work avoidance goal	2.87	3.40	10.37*
functional goal	3.27	3.89	24.68

social solidarity goal	2.62	3.15	13.89**
efficacy belief	3.74	4.17	16.91
Task value	3.03	3.69	38.37***
Mastery learning climate	2.88	3.56	42.68***
Performance learning climate	2.41	2.53	1.25
self-regulation (beginning)	3.10	3.42	13.74**
self-regulation (during)	2.99	3.42	17.15***
Self-regulation (end)	2.93	3.26	8.45*

Note. ***p<.0001; **p<.001; *p<01.

The ANOVA findings showed significant differences between the two groups of lessons perceived from students' perspectives. Students who generally thought that the lessons were motivating and commented favourably also scored higher in the motivation constructs in the structured diary with exception in functional goal, efficacy belief and performance learning climate. Students who thought the lessons were motivating would learn more with mastery goal, social solidarity goal and less with work avoidance goal. They also perceived that these lessons had a mastery-oriented climate and monitored their learning throughout the lessons by employing different self-regulatory strategies at different stages. The reverse is held when students commented relatively unfavourably about a lesson.

In order to further the understanding of the distinction between these two groups of students' rated lessons, a discriminant function analysis was performed to locate the predictors that discriminate between these two lesson groups. 271 cases were used in the discriminant analysis. Functional goal, efficacy belief and performance oriented learning climate were excluded from the analysis as they failed the ANOVA tests. Using a direct method, all the other variables were entered simultaneously for a discriminant analysis.

Only one discriminant function was estimated as there were two groups in the criterion variable. The eigenvalue of this function was .33, which accounted for 100% of the explained variance. The Wilks' Lambda value of this function was .75 with a transformed c^2 of 75.12 (df, 9; p<.0001). With a canonical correlation at .51, the function accounted for around 26% of the between-group variability.

Table 4 shows the structure matrix of correlation between the significant predictors and the discriminate function. The best predictors were mastery learning climate, task value and mastery goal. These three predictor variables loaded relatively stronger into the function. Loading less than .50 was not interpreted.

Table 4: Structure Matrix

(Pooled within-groups correlations)

Predictors	Canonical loading values
mastery learning climate	.70
Task value	.66
Mastery goal	.61
self-regulation (during)	.44
social solidarity goal	.40
self-regulation (beginning)	.39
work avoidance goal	.34
performance goal	.33
self-regulation (end)	.31

The relative importance of these three predictor variables can be corroborated by the Wilks' Lambda values. Table 5 presents the Wilks Lambda values of all the predictor variables. All predictor variables, when considered independently, were significant in differentiating the motivating lessons from the unmotivating lessons. Wilks Lambda value can range between 0 and 1. A value at 1 or close to 1 indicates no separation of the groups. A value at 0 or a lower value represents progressively a greater amount of group separation. The relatively lower Wilks' Lambda values of mastery goal, task value and mastery learning climate indicated that when taken as individual predictors they were relatively more effective in separating the two groups than the other predictor variables.

A check of the mean scores and standard deviations in these three variables confirmed the above analysis. Students' rated lessons as motivating collectively had a higher score in mastery goal (mean=4.34; SD=.79), task value(mean=3.69; SD=.83), mastery learning climate (mean=3.56, SD=.81) than those grouped as unmotivating. Students who

commented unfavourably of a lesson rated relatively lower in mastery goal (mean=3.70; SD=1.01), task value (mean=3.03; SD=.93), mastery learning climate (mean=2.88, SD=. 91) in those lessons.

Table 5: Wilks' Lambda & Univariate F-ratio

predictor variable	Wilks' Lambda	F ratio (1, 269)
mastery learning climate	0.863	42.67***
task value	0.875	38.37***
mastery goal	0.890	33.18***
self-regulation (during)	0.940	17.15***
social solidarity goal	0.950	13.89**
self-regulation (beginning)	0.951	13.74**
work avoidance goal	0.962	10.37*
performance goal	0.965	9.51*
self-regulation (end)	0.969	8.45*

Note. ***p<.0001; **p<.001; *p<.01

Among the 117 cases in the motivating lesson group, 82 cases (70.1%) were classified correctly. As for the unmotivating lesson group, 112 out of 154 cases were grouped correctly (72.7 %). Overall, with this discriminant function, 71.59% of all the cases (N=271) was correctly classified. This indicates that using students' general comments as criteria to classify students' perceptions of a lesson into motivating versus unmotivating was viable. The results supported the notion that students who commented favourably about a lesson would rate their motivational constructs related to that lesson higher.

Discussion

Students distinguished a motivating from an unmotivating lesson. The distinction was not judged from an objective check of a lesson. Rather it was based on students' own specific self structures, which were used for making this classification. The significant ANOVA tests and the use of a strict Post Hoc difference test provided strong evidence that students were using their own self-structures to assess lessons. Efficacy, mastery, interest and self-regulation were the main self-structures these students employed in assessing lessons.

Students showed higher motivation as demonstrated in the scores of the motivational constructs in the structured diaries when they perceived that a lesson was motivating. Learning situations that were considered favourable, as shown in students' comments in the open diary, would lead to a higher level of learning motivation. More specifically students would learn more with mastery goal, consider the task as interesting and useful, and perceive the learning situation to be mastery oriented when they perceived that a lesson was motivating from their own self-structures. These three variables predicted the separation between motivating and unmotivating lessons perceived from students' specific perspectives.

In other words, students will be more likely to value a task and learn with a mastery goal as well as perceiving that the learning environment is mastery oriented after they have consider a lesson task through the following self-enquires: Do I have the ability to do this task? Do I understand what has been taught in relation to this task? Do I find this task interesting? Do I need extra practice on this task after the lesson? These findings are in agreement with Ng's study (1998) of the relationships among self-schemas, learning goals, learning approaches and performance.

Conclusion

This study provides initial evidence that students' classroom motivation is an assessment-based process, which involves relevant learning self-structures. The diaries showed how students perceived their mathematics lessons and what types of self-structures were salient in the motivating process. This study vouches the validity of a situated approach to classroom motivation, which maintains that classroom motivation is in a dynamic and fluid mode. The value of this approach lies in its emphasis on the process-oriented motivation concept and its allowance for the dynamic interplay between the self-system and the classroom environment. While studies in intra-psychic variables have been successful in finding out why students are motivated, more effort is needed to delineate how students are motivated in a learning situation. The current study represents an initial attempt to unfold such a complex process using a situated approach. However, as the sample in this study is highly skewed, the findings should not be generalised to students with different learning and achievement characteristics. To further develop the notion of situated motivation, future efforts are needed in designing research that captures not just the complex assessment

process from students' perspectives, reciprocal effects as well as long-term effects from all the relevant variables in a learning situation should also be taken into account.

The lesson diary, as a research tool, is proved to be an effective means in tapping information of classroom motivation process. It allows students to reflect on their own assessment based motivation process. It is also effective in tapping the dynamic and fluid nature of classroom motivation. However, it has serious limitation as it relies heavily on students' persistence and teachers' cooperation for its completion. What exacerbates the aforementioned problem is that low achieving students may lack developed positive learning selves that enable them to engage in such a highly disciplined endeavour in a persistent manner. Videotaping with follow-up interviewing can be an effective means to overcome the difficulties in digging data out from low achieving students. However, interviewees needed to be selected carefully as this data collection procedure is resources intensive.

This study has meaningful implications for classroom teachers. First, it sheds light on why classroom intervention based on generalised psychological principles may not always yield expected results. The explanation lies in that the dynamic nature of classroom motivation has not been scrupulously considered. Second, the situated concept of classroom motivation demands teachers to treat each learning situation as a unique entity and understand how students will interpret it from their perspectives. In order to do this effectively, teachers need to know their students and be very skilful in designing classroom activities.

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Appendix 1: A Sample of Diary Comments

Date: 20 May (2:15-3:00p.m.) Topic: Factorisation

Code	Diary comments
M102	Work was easy because I already knew how to do it.
M103	Today we were revising Factorising/Expanding - it was really simple and it didn't take much thought.
M105	Today's lesson was still revision with application of new studies; same as yesterday.
M107	Good, it was alright, I didn't have my textbook, so I did no work, so it was pretty boring. I was thinking about tomorrow mornings Champions Soccer League Final between Jvvents and Real Madridy Losta and I am going to put money on Real Madridy.
M110	We got more work done today than any other work we have completed this past week. I was speeding through the exercises in the textbook because I knew what to do and it was very familiar. I'm in a happy mood because of this.
M111	Okay. Some was hard.
M113	The exercise I did today was OK because there were some that were pretty hard, so it made me think a lot about the problems. I had some trouble with the last few questions of the exercises, but I figured them out.
M115	I actually found I could do it, including some of the hard ones. However I have to really try because our exam is soon and we haven't got much work done because of work experience.
M117	Today we did more factorising. It was pretty easy and I didn't need any help. I asked the teacher when the test was but she isn't sure. She also showed us a pattern for perfect squares.
M118	Today's lesson was very good. I enjoyed it. It was challenging. I'm glad that it's the end of the diary. I loved factorising and expanding.
M119	We learnt about factorising today. It is sum ----> product, very interesting. Okay it's the end and end of diary. So I'm glad because (it's) very hard to write a diary. Factorising is fun. Bye
M121	Again, the work was quite easy. But I wasn't working very fast today ... in fact quite slow compared to the speed at which I usually work.
M122	Today we learned an easier way to factorise. Before we use to do it the long way. We used to do the box thing. Now we just do it in less than half the time. Today I didn't really talk. Only when I asked the teacher the date of the maths exam.
M123	This lesson was basically revision on things that we have done before. For the past few lessons and for the past week, we were at Work Experience so this is just a refreshment. The work was easy and I was able to get it done quickly.
M124	We looked at something we had already learnt in a different perspective ... pretty helpful. Factorising and even more homework to do ...
M125	The lesson went heaps fast probably because the teacher spent the start of the lesson explaining and revising what the exercises we were going to do this lesson. I

	only found 1 question hard but then asked the teacher to explain it. I asked Liz next to me
M127	I was 15 min late to class when I walked into the class, everyone was doing their work. I did some of the exercises and it was still very easy, ... but I can see that it was a bit harder than the work we did last few days. My friend was still away.
M128	I'm feeling really tired, because it's last period. I have to do like question 6, 7 & 8, but I had done 5. That's so stupid. I'm not really happy today cause I have to walk home and had to go to locker. My teacher asked some people to answer on the white board
M129	We have been doing factorisation problems today instead of expanding problems like we've been doing for the last few days. This is much more challenging than expanding. I feel less attentive today than yesterday because I feel so tired.
M131	My teacher said I better start working in class more because she records I have cruised through maths for too long and I will have trouble with my study habits for next year. She said if I don't change I will have trouble.
M132	This lesson was hard to keep up with because the teacher talks so fast and doesn't explain everything that well.
M133	This lesson was a waste time because nothing new was learnt.
M134	The exercises which I did today were harder than the ones we have been doing throughout the week. I got stuck on a few questions and hand to ask my friends for help. I think these are the most likely questions which are going to be on the mid-semester exam.

Appendix 2: Diary Comments of M118

date	Diary Comments
7 May	GO, GO...We had a time to look at the maps we should have copies yesterday. We had to measure the distance, but it seemed that most of people is not doing it, It, maybe, was a useless time. I don't think I learned much in this lesson. But we could have a break
8 May	Today's lesson was quite good. We reviewed about factorize and expanding. I liked the questions on the board. It was quite challenging, especially in the speed I hope we'll continue on this.
18 May	Today's lesson was good. I liked algebra problems. But they were not much complex and so much, they were too ... easy.
19 May	We've learnt algebra expanding and factorising. And also our green book. It was quite challenging and enjoyable.
20 May	Today's lesson was very good. I enjoyed it. It was challenging. I'm glad that it's the end of the diary. I loved factorising and expanding.
22 May	We've learned a new thing for the factorising, but I already knew it before. I felt my brain was getting slower. Didn't like the feeling. But I liked factorising. I've finished all of my homework, as usual ...
25	I liked this lesson.

May	
26 May	I've got confused a little, but it was okay. I liked it and participated in it.
27 May	It was quite okay. I liked it.
28 May	I liked the works. It was quite challenging.
10 June	Boring.... Hoped we had a free time, because we've just finished our test Tuesday.... (drawing of a girl)
11 June	It was quite interesting. But I'm getting bored because we finished our test and we still have to learn and practise new skill. I am getting bored and bored.
12 June	Learnt about cancelling products. It was okay....but boring.
15 June	It was very boring. Because of that my teacher was not here we had to just do it by ourselves. It was too quiet to work. I didn't like the surroundings today. It was very boring.
17 June	....It was quite okay; and enjoyed it. It was quite easy.