Modeling intensive classroom data

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Introduction

Students’ engagement and learning motivation are fundamental components of the learning process:

– engaged and motivated students show behavioral involvement in learning and positive emotional tone

– disengaged and unmotivated students are easily bored, give up learning tasks and display negative emotions (Fredricks, Blumenfield, & Paris, 2004; Wigfield & Cambria, 2010).
Introduction

- Research on engagement and motivation has typically focused on students’ self-reports of their overall engagement or learning motivation (e.g., student engagement, achievement beliefs, and task values).
- Students’ lesson-specific engagement and motivation have been seldom studied (Finn & Zimmer, 2012; Eccles & Wang, 2012).

- Investigation of students’ engagement during school lessons is likely to increase our understanding of the complexity of students’ engagement from one lesson to another.
Study 1: Assessment of Students’ Situation-Specific Engagement

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Aims

In the present study, we examined

1. To what extent lower secondary school students’ engagement and motivation varies from one lesson to another?

2. What is the factor structure of a newly developed instrument (InSitu) developed to investigate students’ engagement and motivation during lessons.

3. To what extent are ratings of situation-specific engagement associated with more traditional questionnaires assessing students’ overall school engagement and motivation (overall student engagement, achievement beliefs, and task values)?
Aims

In the present study, we used mobile technology to collect intensive data on lesson-specific engagement among secondary school students, and examined

1. To what extent secondary school students' engagement and motivation varies from one lesson to another?

2. What is the factor structure of a newly developed instrument (InSitu) developed to investigate students' engagement and motivation during lessons.

3. To what extent are mobile ratings of situation-specific engagement associated with more traditional questionnaires assessing students' overall school engagement and motivation (overall student engagement, achievement beliefs, and task values)?

4. To what extent is variation in students' situation-specific engagement dependent on context-related factors, such as (4a) the day of the week and (4b) the subject being studied?
Participants

- **901** Grade 7 students (443 girls, 458 boys)
- Approximately **2.79 ratings** for a student after randomly selected lessons over 11 weeks (range 1–17)
- Altogether, **2511 ratings** gathered from 29 schools and from 77 classrooms
- Lessons included 16 different subjects
InSitu instrument was developed to assess students’ situation-specific engagement.

- Used in a form of a mobile application
- The application was pre-programmed into smart phones which were handed out to the students at the end of each lesson

The InSitu instrument (Mobile application “Välkky”) consisted of:

- Background information (name, school, class)
- 17 items rated on a 5-point scale (1 = not at all, 5 = very much)

Validation study for InSitu instrument:
Measures

Overall school engagement. Overall school engagement was measured using a Finnish short version of the Student Engagement Instrument (Appleton et al., 2006).

- Control and relevance of school work (6 items, α = .81, e.g., “When I do schoolwork I check to see whether I understand what I’m doing.”)
- Teacher-student relationship (3 items; α = .88, e.g., “At my school, teachers care about students.”)
- Future aspirations and goals (3 items, α = .86, e.g., “Going to school after high school is important.”)
- Peer support in learning (3 items, α = .84, e.g., “Other students at school care about me.”)
- Family support in learning (3 items; α = .81, e.g., “When I have problems at school, my family/guardian(s) are willing to help me.”).
Measures

**Task values.** Students’ task values (Eccles et al., 1983) were assessed by asking them with 12 questions (1) how important, (2) how useful, and (3) how interesting they though the Math and Literacy (mother tongue) as a school subjects were. Every dimension of task values were asked by two questions and they answered to these questions separately for each of the two subject on a 5-point scale (1 = not at all, 7 = very much).

- For Math, Cronbach’s alphas for importance, usefulness, and interest were .88, .76, and .87, respectively. For Literacy, Cronbach’s alphas for importance, usefulness, and interest were .85, .79, and .82, respectively.
Measures

Achievement beliefs. Students’ achievement beliefs were assessed using shortened version of the Achievement Beliefs Scale for Children (ABS-C; Aunola & Nurmi, 2006). Students were presented with ten statements regarding their typical thought and behaviour in academic situations and were asked to evaluate these statements on a 5-point scale (1 = not true, 5 = very much true).

- Task avoidant-behaviour (4 items, α = .80, e.g., “I sometimes delay starting on my exercises”; “If the exercise is difficult, I prefer doing something else”)
- Mastery orientation (3 items, α = .75, e.g., “I can do even difficult school task right away”; “I enjoy working even with challenging school tasks”).
Results
Variation between situations

- Intraclass correlations were significant ranging from .26 to .46, and thus, indicated variation in both within students and between students.
- More than half of the variation was in the within level.
The Hierarchical two-level CFA resulted in a five-factor structure for the *InSitu* Instrument:

- **Behavioral engagement** (7 items, \( \alpha = .83 \), e.g., “How persistent were you in studying during this lesson?”, “How much effort did you invest to satisfy the teacher’s expectations?”, “How much did you plan tasks ahead instead of just doing them right away?”);

- **Emotional engagement** (3 items, \( \alpha = .85 \), e.g., “How much did you enjoy the lesson?”, “How enjoyable did you find the tasks at hand?”);

- **Disaffection** (3 items, \( \alpha = .68 \), e.g., “How boring did you find the lesson?”, “How much did you do other things than tasks at hand?”);

- **Competence experiences** (2 items, \( \alpha = .81 \), e.g., How well did you understand what was taught?);

- **Help-seeking** (2 items, \( \alpha = .76 \), e.g., How much did you ask for help from your classmates during the lesson? )

These factors explained between 12% and 64% of the variance in the items at the within level and from 40% to 98% at between level.
Correlations between InSitu factors and students’ general engagement and learning motivation.

<table>
<thead>
<tr>
<th></th>
<th>AFF</th>
<th>BEH</th>
<th>COMP</th>
<th>DAFF</th>
<th>HELP</th>
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<td>Control and relevance of school work</td>
<td>.45***</td>
<td>.55***</td>
<td>.40***</td>
<td>-.37***</td>
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<td>.34***</td>
<td>.21***</td>
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<td>.39***</td>
<td>.40***</td>
<td>-.22***</td>
<td>-.15**</td>
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<td>.22***</td>
<td>.22***</td>
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<td>Importance of Math</td>
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<td>-.18***</td>
<td>-.12**</td>
<td>3.68</td>
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<td>0.84</td>
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Note. *p < .05, **p < .01, ***p < .001. AFF = Affective engagement; BEH = Behavioral engagement; COMP = Competence experiences; DAFF = Disaffection; HELP = Help-seeking.
Conclusion

This study is among the first empirical studies which provide information on students’ situation-specific engagement.

The results suggested that the InSitu Instrument is a usable and valid tool for investigating students’ situation-specific engagement and gaining information about sources of and variations in engagement in day-to-day situations at school.

- Such instrument could provide valuable information for teachers about the ways in which to support students’ classroom engagement and to identify early signs of disengagement (Appleton et al., 2006; Finn & Zimmer, 2012; Klem & Connell, 2004).

- Such instrument is useful for developing classroom activities and materials that increase student engagement and motivation in class.

- Instrument is also useful in the development of interventions and professional development programs for teachers.
Study 2:
Variation in Situation-Specific Engagement among Lower Secondary School Students

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Conclusion

The results indicated that students experiences of situational engagement vary during the school week depending on contextual factors.

Findings imply that

- students need more active support for engagement in some subjects, particularly in traditional academic subjects such as mathematics, than in other subjects that lend themselves more easily to exploration and learning by doing.
- each lesson offers a unique opportunity for teachers to engage their students in active participation and for students to be engaged in activities.
- the knowledge gained from students’ situation-specific experiences of engagement can help in providing effective individualized support in learning situations and feedback for tea
Thank you!

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References


