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# Perspectives on Momentary Engagement and Learning Situated in Classroom Contexts

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## Abstract

*In recent years, there has been a strong call for more fine-grained analyses of student engagement to better capture its nature as a situated, momentary phenomenon. This special issue aims to promote cross-disciplinary discussions about the complex processes involved in students' momentary engagement and learning situated in classroom contexts. Momentary engagement is conceptualised as students' involvement with learning activities over short time intervals. We begin by presenting definitional, conceptual, and methodological reflections on the construct of momentary engagement, highlighting how moment-to-moment analyses can deepen our understanding of how engagement unfolds in complex, dynamic learning environments. Next, we discuss the need for a holistic and multidisciplinary perspective to foster an integrative understanding of contexts and conditions under which students engage in academic tasks. Finally, we provide a brief overview of the papers in this special issue, emphasising their diverse methodological approaches to capturing students' momentary engagement and summarising their main results that offer practical insights on supporting engagement. Each contribution reflects the efforts of a multidisciplinary team who have studied students' momentary engagement and learning across various contexts, combining insights and identifying cross-disciplinary synergies in theory and method. The authors integrate perspectives from various fields of research, including motivation, emotion, self-regulation, engagement, social interaction and conceptual change.*

Keywords: momentary engagement; situational engagement, classroom context, classroom behaviour, social interaction

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## 1. Introduction

How can we describe, explain and predict students' engagement during the execution of learning activities? Why are some learners actively engaged while others struggle to stay focused? What can educators do to facilitate meaningful interactions and constructive involvement in academic tasks? Educators, policymakers, and researchers are continually striving to find the best possible answers to these questions, aiming to enhance student engagement and improve learning outcomes. These complex and multifaceted questions do not lend themselves to simple solutions because research shows that every moment of every day matters for every student. Understanding how engagement unfolds from one moment to the next requires a fine-grained analysis of the specific context and conditions that support or thwart students' engagement during learning. This special issue presents a set of five empirical studies and one commentary that explore students' momentary engagement situated in various classroom contexts. Factors influencing momentary engagement and learning are numerous and often interconnected, encompassing cognitive, emotional, social, and environmental aspects. To develop a comprehensive understanding of students' momentary engagement in dynamic classroom environments, it therefore requires an interdisciplinary perspective that draws on insights from different academic disciplines. Taking a multidisciplinary approach, the special issue integrates perspectives from different fields of research including motivation, emotion, self-regulation, engagement, social interaction and conceptual change. Each contribution represents the efforts of a multidisciplinary team of authors who have studied students' momentary engagement and learning across various contexts, combining insights from their respective fields and identifying cross-disciplinary synergies in theoretical perspectives and research methodologies.

## 2. Momentary Student Engagement: Definitional, Conceptual, and Methodological Reflections

In educational research, engagement has become one of the most prominent constructs because of the accumulating evidence that links engagement to highly valued learning outcomes (Fredricks et al., 2004; Reschly & Christenson, 2022). While researchers widely acknowledge the significance of this construct for achievement and academic progress, there is considerably less consensus regarding its conceptualisation and measurement across various studies (Eccles, 2016; Skinner & Raine, 2022; Wong & Liem, 2022). At heart, engagement draws on the idea of active behaviour, investment or participation in learning activities and is commonly understood as a multidimensional construct that conceptualises how students think (cognitive engagement), feel (emotional engagement) and act (behavioural engagement) during the execution of academic activities (Fredricks, 2022). Theories of engagement are often rooted in the motivation literature, emphasizing the importance of external contexts (e.g., family, schools, peers) as well as learners' internal dispositions and appraisals (e.g., task value, competencies), both of which are assumed to shape students' engagement and learning (Reeve, 2012; Reschly & Christenson, 2012; Wang et al., 2019). Engagement can be conceptualised across different timescales (e.g., seconds to years) and at different levels such as schools (e.g., engagement in extracurricular activities), classrooms (e.g., collaborative problem-solving with peers) or specific learning tasks (Azevedo, 2015; Skinner & Raine, 2022; Wong & Liem, 2022). It is this multilevel complexity within the construct that challenges researchers to find and agree upon a shared construct terminology and definition. One important distinction involves the separation of macrolevel school engagement from microlevel learning engagement as suggested, for example, by the *Dual Component Framework of Student Engagement* (Wong & Liem, 2022). On each level, engagement can occur in different timescales such as moments, days or weeks. Recently, researchers have reminded us that the concept of engagement was originally introduced with an emphasis on its situated and momentary nature (Eccles, 2016; Eccles & Wigfield, 2020). However, this focus is not reflected in the academic literature, where research on engagement occurring across momentary time has received relatively little attention thus far (Salmela-Aro et al., 2021; Symonds et al., 2024). In fact, in the current edition of the *Handbook of Research on Student Engagement* (Reschly & Christenson, 2022), the terms "momentary engagement" or "situated

engagement" are not mentioned even once. It is therefore understandable that, recently, there has been a strong call for more fine-grained analyses of student engagement to better comprehend its nature as a situated, momentary phenomenon (Symonds et al., 2021; Symonds et al., 2024).

So, what is momentary engagement and why does it matter? Momentary engagement describes students' interactions with learning activities across short time intervals. Symonds et al. (2024) suggest classifying micro- and macrolevel engagement according to aspects of agent, task and time. Students' momentary engagement is located at the microlevel and encompasses the learning experiences of individual students during the execution of a specific task across momentary time, i.e., a child solving a mathematics problem. However, a recent review of the literature revealed that there is no agreed upon definition of momentary or situational engagement among scholars (Symonds et al., 2024). Possibly due to the challenges of measuring engagement occurring at the momentary time scale, most of the research in the field is focused on students interacting with a broader context such as engagement in subjects, schoolwork, or schooling (i.e., participating in mathematics, school-related tasks, or extracurricular activities). In contrast, studying engagement at a microlevel time scale allows for a deep exploration and understanding of the specific conditions that promote or hinder meaningful engagement and learning. This includes a precise description of the learning context, the nature of the academic task, the learners' prior experiences and prerequisites, as well as the type of interactions with the teacher or peers. Exploring the variance in engagement, longitudinal research has shown considerable variability both within and between students (Böheim et al., 2024; Martin et al., 2015; Patall et al., 2016). It is this variability that supports the need for a moment-to-moment analysis with a detailed exploration of the learning context and the interaction between the task and the individual learner. Insights gained from such research hold significant practical value, enabling the design of effective learning tasks that are tailored to the needs of individual students across different contexts.

Momentary engagement and situated learning share a conceptual connection in that both emphasize the importance of context, task, and social interaction in learning (Brown et al., 1989; MacLellan, 1996; Symonds et al., 2024; Wang et al., 2019). Situated learning, which has a longer history in educational research (see, Brown et al., 1989), posits that the process of learning is deeply embedded in its environment and highlights the role of social interaction and real-world application in knowledge construction (Billett, 1996). In contrast, momentary engagement is a relatively new construct that examines transient, fluctuating levels of behavioural, cognitive, and affective involvement at specific moments within a learning activity (Symonds et al., 2021; Symonds et al., 2024). While research on situated learning faces similar methodological challenges as discussed before, some scholars have examined learning in specific classroom situations. For example, research on actor-oriented transfer explores how learners perceive and construct connections between contexts (Lobato, 2003, 2006), while research on expansive framing investigates the application of knowledge across different contexts (Engle, 2006; Engle et al., 2012). However, although these studies emphasize the role of context in learning, they have a strong focus on knowledge construction and transfer rather than the dynamic, momentary fluctuations of emotion, cognitive focus and behaviour that are central to research on momentary engagement.

The use of appropriate methodologies is critical to accurately capture the cognitive, behavioural, and emotional processes that occur while students are engaged in academic tasks (Azevedo, 2015). Researchers have studied engagement from multiple perspectives (i.e., students, teachers and observers) and with different measures (e.g., self-reports, observations, experience sampling; for a review, see Fredricks et al., 2019). Contributors from the present special issue triangulate different methods including systematic observation, text logs, video- analysis, physiological data or self-reports and use multiple informants (peers, teachers, students, researchers) to capture engagement data from different viewpoints. Student engagement is measured at the momentary level reflecting on learning situations at the microlevel grain size of time. For example, Tang et al. (this issue), used the experience sampling method (ESM) to assess students' situational engagement during a lesson. Baines et al. (this issue) and Symonds et al. (this issue) conducted systematic classroom observations of student momentary engagement, using time intervals of 10 to 30 seconds. Renninger et al. (this issue) analysed moment-to-

moment records of groups of students' engagement, based on chat logs from the virtual environment in which they were working. And finally, Haataja et al. (this issue) captured students' physiological data to explore momentary engagement in collaborative learning tasks measured via electrodermal activity. The commonality across these measures is that they allow researchers to collect engagement data on a momentary time scale within the scope of well-defined educational contexts.

## 3. Advancing a Holistic Perspective on Momentary Engagement Among a Multidisciplinary Network of Educational Researchers

From 2020 to 2023, the European Association for Research on Learning and Instruction (EARLI) and the Jacobs Foundation funded an Emerging Field Group (EFG) titled the *Integrated Model of Momentary Learning in Context* (IMMoLIC). The group was facilitated by the authors of this paper and the goal of this group was to bring together perspectives on how students learn across seconds and minutes in classrooms. The group was inspired by the development of the momentary engagement construct in educational psychology; work that was prompted in the 2010s when motivation researchers in the US conceptualised different grain sizes of engagement (Sinatra et al., 2015; Skinner & Pitzer, 2012) and began calling for attention to how students engage in their learning across real time, i.e., 'when the rubber [of the car tyres] hits the road' (Eccles, 2016; Kaplan, 2016). A group of European colleagues (Symonds, Upadyaya, and Salmela-Aro) began collaborating on the momentary perspective in 2015, developing it into an intervention programme (Torsney & Symonds, 2019) and building a writing team with US motivation and engagement researchers (Kaplan, Eccles, and Skinner). Kaplan had been working on a dynamic systems approach to understanding identity (Garner & Kaplan, 2019) and the writing team applied the same approach to the momentary engagement construct to develop it into a process-based perspective that highlighted the complexity of learning in the moment.

In the momentary engagement perspective, engagement comprises multiple components (motivation, emotion, cognitive action, and physical action) which co-act simultaneously and sequentially as the person interacts with the environment, creating a fluid and responsive dynamic psychological system (Symonds et al., 2024). To understand engagement as a momentary dynamic system requires researchers to go beyond static models and concepts that assume individual psychology functions as mechanistic interactions between separate cognitive components. This type of reasoning is built more on current statistical modelling technology and less on what happens in the real world as an individual student engages with work in class. The limitations in the design and application of previous models of motivation and engagement inspired a bid for an EARLI EFG award to support a group of researchers comprising early career and established academics from across higher and lower income countries in Europe. The EFG's mission was to advance the field and help future theory building by integrating models and theories of engagement, motivation, emotion, meta-cognition, and conceptual change, into a holistic perspective on how students learn in real time in classroom settings. Across the three years of the award, the EFG built a model library consisting of a range of established theoretical perspectives, ran an online 'model club' where each group member presented a different conceptual perspective once per month, and hosted in-person workshops in Ireland and Greece which focused on networking, collaboration, and integrating perspectives through collaborative research activity. This special issue is the culmination of that work.

## 4. Different Perspectives on Momentary Engagement and Learning

This special issue set out to promote cross-disciplinary discussions on the complex process of students' momentary engagement and learning in classroom contexts. Each of the five empirical contributions focuses on a different aspect of momentary and situated engagement, learning and performance. It brings together research from different disciplines that draw on varying theoretical frameworks to conceptualize, measure and study momentary engagement. Participating authors come



from different fields of research on motivation, emotion, self-regulation, engagement, social interaction and conceptual change. Integrating research from diverse disciplinary perspectives holds great potential for exploring the contexts and conditions under which students engage in academic tasks, for identifying what keeps them engaged, and for understanding why their engagement may change from one moment to the next. Each contribution investigates unique research questions on individual and contextual factors that are assumed to be central for understanding students' momentary engagement. The results presented across the contributions highlight various factors influencing situational engagement and learning. These include social aspects of context, such as peer relations or group dynamics; aspects of the learning context, like class size; and individual factors, such as self-appraisals, experiences of self-regulation, emotions and motivation. Across contributions momentary situated engagement is captured at different time scales and analyses are performed at different levels of granularity.

The first article by Tang and colleagues examines optimal learning moments (OLM; the moments of being highly challenged, skilled and interested) in Finnish and US science classrooms, exploring how students' perception of challenge, skill, and interest in task engagement is shaped by various co-occurring experiences. Using experience sampling methodology and network analysis, the study analysed multiple responses from high school students to understand which situational experiences and feelings correlate with OLM. The main findings reveal that OLM are frequently associated with feelings of concentration, success, and control, meeting expectations, and positive emotions such as enjoyment of the task, while negative emotions like boredom and loneliness are rarely present. The discussion highlights that fostering positive attitudes toward science and encouraging creative activities can enhance situational engagement, while competitive feelings and a sense of pride can be beneficial, provided they are maintained at a moderate level. The study points at the strengths of experience sampling to assess engagement across momentary time combined with collecting data on co-occurring situational learning experiences elicited by the task context.

In the next article, Baines and colleagues shed light on the relevance of peer relations (both academic and social) for students' observed momentary on-task and off-task engagement, as well as their link to academic performance in primary schools. Using a multi-method approach, including peer and teacher reports, self-assessments, and classroom observations, the study examines different levels of engagement (momentary, classroom, and school). Findings indicate that academically focused peer relationships are more strongly linked to momentary engagement and academic success compared to socially oriented peer relations, which are more associated with measures of disengagement on the class and school level. Looking at the results and the associations between the different engagement measures, it becomes evident that momentary engagement is empirically and conceptually different from class- and school-level engagement reflecting a unique behavioural phenomenon beyond these more general measures of engagement. Results draw our attention towards the complexity of peer contexts and their fundamental role in understanding students' active engagement in classroom learning. Moreover, the study calls for more research that is mindful of the nested nature (e.g., school, classroom, learning task) and different time scales (e.g., moments, lessons) associated with the engagement construct.

The next study by Symonds and colleagues examines how class size influences children's momentary behavioural engagement in Irish primary schools. Using systematic observations of over 600 children in 121 classrooms, momentary data were collected on students' on-task and off-task behaviour during regular classroom instruction. Multilevel path models showed that smaller classes were associated with higher on-task engagement, while off-task behaviour was higher in larger classes. Analyses incorporating various individual and classroom-related factors illustrate the inherent complexity of this relationship. For instance, lower ability was a risk factor for students' momentary engagement in larger classrooms, whereas momentary disengagement was lower in larger classrooms with a higher proportion of students with special educational needs. The study highlights that students' momentary engagement is situated within a complex network of contextual factors that can enhance or mitigate their individual effects when considered together.

The study by Renninger and colleagues investigates how middle school students' phases of problem-solving (Exploring, Constructing, and Checking) relate to their use of executive functions and



collaborative problem-solving behaviours during moments of math activity. They studied two groups of students who worked collaboratively on open-ended geometry tasks in the Virtual Math Teams environment; each group communicated with one another via a chat tool. For each identified math moment, researchers analysed shared use of a dynamic whiteboard and their chat logs to assess students' momentary cognitive and behavioural engagement during the phases of problem solving. Study findings showed that the student groups varied in their cognitive and behavioural engagement in different phases of problem solving. The results pointed to the benefits of students engaging in exploration in particular, as it was associated with their increased use of working memory and collaboration. The results also suggested that students may need support to collaborate during moments when they are engaging in constructing and checking.

Finally, Haataja and colleagues examine how students' momentary engagement in collaborative learning (CL) is related to self-reported perceptions of CL, video-coded regulation of learning and group performance. Using multimodal data, including electrodermal activity and video recordings, the study analysed 94 students collaborating on physics tasks across multiple lessons. Students' physiological synchrony (PS) was used as a proxy for momentary engagement in CL. Findings indicate that PS was associated with situated value appraisals of collaboration and exam performance. This study highlights benefits of integrating multiple data channels to gain a comprehensive picture of the context and the complex nature related to the multidimensional phenomenon of momentary engagement. In line with the other papers of this special issue, the authors found considerable variations in their engagement data, calling for more fine-grained analyses of momentary engagement that capture its temporal dynamic from one moment to the next.

The special issue concludes with a commentary by Kyriakopoulou, who is a well-established scholar in the field of conceptual change research. In her commentary, Kyriakopoulou discusses how conceptualisations of momentary engagement differ across studies and how this field of research would benefit from a more integrative, holistic perspective to further expand our understanding of momentary engagement through the lens of conceptual change research. The commentary highlights the multifaceted nature of momentary engagement, particularly when addressing complex learning processes associated with conceptual change. It emphasises the need for a holistic view of momentary engagement that integrates components within both the individual and the context. Learner characteristics, prior knowledge, and epistemic beliefs are thought to significantly shape how students engage, particularly in challenging learning contexts. The discussion clarifies that momentary task engagement can involve deep learning processes such as negotiating conflicting prior knowledge and adapting it to new concepts. Regarding methodology, it recommends triangulating data from different channels to capture the dynamic and situated nature of momentary engagement. The commentary emphasises that current conceptualisations of momentary engagement often overlook the complex nature of situated engagement, particularly in contexts where students need to revise deeply held beliefs or confront conflicting information. It therefore argues for a shift toward viewing momentary engagement as an interconnected, dynamic system where different components interact, rather than as isolated elements. The commentary closes by encouraging future research to promote a more integrative and holistic perspective on momentary engagement to deepen our understanding of how engagement unfolds in real-time and how it can be better supported in educational learning settings.

## Keypoints

- Definitional, conceptual, and methodological reflections on momentary engagement are presented.
- The need for a holistic and complex perspective on momentary engagement is discussed.
- The history and activities of the Integrated Model of Momentary Learning in Context (IMMoLIC) Emerging Field Group are explained.
- A summary of papers in the special issue is given.

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