

# Learner Engagement in Computer-Supported Collaborative Learning Activities: Natural or Nurtured?

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**Abstract.** Drawing on a mixed-methods study this paper aims to investigate what constitutes learner engagement and how postgraduate students engage in computer-supported collaborative learning (CSCL) activities (such as video-conferencing and blogging) in a real-life setting. This research contributes to current literature by proposing the WISE Taxonomy of Learner Engagement Archetypes which portrays the most universal engagement approaches that emerged within the studied context. The findings show that CSCL activities may engage postgraduate students irrespective of their perceived preference over individual or social learning. The findings also suggest that given certain conditions students may strategically disengage from CSCL activities and as a result they may fail to appreciate CSCL as an authentic activity which leverages the opportunity to learn from and with each other, as well as from the wide range of digital resources openly available to them.

**Keywords:** learner engagement, computer-supported collaborative learning, collaborative technologies, postgraduate education.

## 1 Introduction

Living, working, and learning in today's knowledge society one cannot escape from the vast amount of information openly available online. Furthermore, innovations in technology use have transformed the way we interact throughout all facets of our lives. Consecutively, learners in educational, professional, and social contexts are no longer mere receivers of information; collaborative educational technology allows them to act, react, and interact yielding new forms of knowledge which is in turn shared and made available to others. Hence, the question is no longer whether technology should be employed in education or not; the question is how we can engage students to assertively share, manage, and acquire new knowledge as well as develop their digital competences within computer-supported collaborative learning (CSCL) environments. Accordingly, the role of higher education in the digital age goes beyond equipping students with subject-oriented knowledge and skills. While educators need to instigate student interest towards a specific subject matter, at the same time they need to activate their engagement towards all aspects of learning (Piki 2010).

One of the main arguments put forward by proponents of CSCL is the ‘engaging’ nature of collaborative technologies (CTs). It has been argued that CTs provide tremendous potential for promoting learner engagement and collaboration, providing creative mechanisms for teaching and learning, and improving the learning outcomes (Clarke et al. 2008; Stahl et al. 2006). However, despite the profound benefits of emerging CTs and CSCL practices, there seems to be limited evidence contributing to our understanding of how – and indeed whether – learners naturally engage with CSCL tasks. There seems to be a persistent belief that the integration of technology in the curriculum will automatically transform the ways learners engage and collaborate with each other as part of their learning. Still, the varied assumptions that exist on the nature of learner engagement in CSCL activities are yet not fully empirically explored. Hence, the focus of this paper is not on learning per se; rather it is on how learners engage with learning activities which are mediated by technology. Furthermore, while many studies have explored the benefits and challenges inherent in CSCL in both formal and informal settings, its application at postgraduate education has yet to be broadly investigated. Therefore the selected milieu for this study was situated within postgraduate education.

The research presented here seeks to explore whether learner engagement is something that comes naturally due to the presence of CTs in teaching and learning practices, whether it is a skill or competence that can be nurtured, or indeed, whether it reflects an even more multifaceted concept. The paper draws on a mixed-methods study which aims to investigate the ways in which postgraduate students engage in knowledge sharing and collaborative activities through technology. More specifically, the focus is on how postgraduate learners engage in real-life CSCL activities, such as blogging and participating in video-conferencing group discussions.

The paper first sets the background to the research and then discusses the methodology and research design employed in the study. The analytical framework and the key findings are presented next followed by a discussion of the findings and the implications for practice. The study limitations and suggestions for further research are also discussed.

## **2 Background**

CSCL is a robust interdisciplinary field with strong foundations in previous theory and research. Its roots can be traced back to the social-constructivist paradigm which is based on the tenet that individuals learn as they verify and improve their mental models through discussion, information sharing, and negotiating meanings with others (Dillenbourg 1999; Grabinger et al. 2007; Stahl et al. 2006). Key scholars in the field suggest that collaborative learning goes beyond an aggregation of individual efforts arguing that “collaborative learning involves individual learning, but is not reducible to it” (Stahl et al. 2006, p. 3). Dillenbourg (1999) also emphasizes that interactions among peers generate higher order mental processes which are conducive to learning.

Unquestionably, the applicability of CTs in education holds voluminous opportunities for generating novel ways of knowing, learning, and collaborating and for offering

“creative activities of intellectual exploration and social interaction” (Stahl et al. 2006, p. 2). Notwithstanding the continuous developments in CTs, the foundation of CSCL research remains to be “centrally concerned with meaning and the practices of meaning making in the context of joint activity, and the ways in which these practices are mediated through designed artifacts” (Koschmann, 2002, p. 18). Towards this end, the main challenge facing educators is making an effective and impactful use of the available CTs in order to facilitate learner engagement, en route for enhanced learner achievement and improved learning outcomes. Yet, to exploit the proclaimed benefits of CTs it is necessary to explore and understand how students are likely to engage in real-life CSCL settings and the plausible mechanisms that underpin their ongoing interactions – both with each other and with the learning content. The current research attempts to address these issues. Although the value of collaborative learning has been advocated for decades, it is argued that new pedagogical models are needed in order to address the complex issues involved in collaborative learning practices when these are mediated by technology (Jaques & Salmon 2007; Piki 2010).

In recent educational research, the importance of student motivation and engagement has shifted from peripheral to central (Murphy & Alexander 2000; Pintrich 2003). In the very broadest sense, learner engagement refers to a “student’s willingness, need, desire and compulsion to participate in, and be successful in, the learning process promoting higher level thinking for enduring understanding” (Bomia et al. 1997, p. 294). Engagement occurs when the student is involved in “active cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation” (Kearsley & Shneiderman 1999, p. 1). It is also argued that “while in principle, such engagement could occur without the use of technology, [...] technology can facilitate engagement in ways which are difficult to achieve otherwise” (Kearsley and Shneiderman 1999, p.1).

Motivational literature is closely related with the study of academic achievement and development (Murphy & Alexander 2000), and appears to be central to research in learning and teaching contexts (Pintrich 2003). The studied literature seems to suggest that engagement is a complex and multifaceted concept (Ainley 2004; Murphy & Alexander 2000) with behavioral, affective and reflective facets. However, no existing theory seems to collectively consider all these dimensions of learner engagement with CSCL. This presents a need for models which explicitly address the complexity and dynamics embedded in learner engagement in – real-life rather than laboratory-based – CSCL activities. Therefore, in the context of this study a holistic view of learner engagement is taken in an attempt to capture the most prominent patterns of engagement that emerged within the real-life CSCL setting under investigation.

### **3 Methodology and Research Design**

#### **3.1 Research Setting and Participants**

The chosen milieu for conducting the study is a postgraduate degree in the interdisciplinary field of Business Information Systems undertaken at a Higher Education Institution (HEI) in the UK. The choice of postgraduate education was triggered by the

observation that within CSCL literature there seems to be a limited number of empirical studies conducted at postgraduate level. This observation coupled with the fact that HEIs are experiencing a rise in the number of students undertaking postgraduate degrees – a situation linked closely with the current critical financial situation – made the particular setting a favorable choice.

The participants were the students registered in two consecutive cohorts of the degree (approximately 45 students per year). The student cohorts were far from homogeneous in terms of age, nationality, academic background, and previous work experience. Each cohort included graduates from various degrees including Computer Science, Engineering, Business Administration, Accounting, and Marketing amongst others. Students were in the age range of early twenties to mid-forties. More than two thirds of the students had previous work experience or were working in conjunction with their studies. Furthermore, the participants formed a multicultural group including students from 23 different countries across Asia, Europe, Africa, and America.

The students were participating in CSCL activities such as blogging and discussions through video-conferencing. The learning objective of the video-conferencing tasks was to enhance their understanding of the course material by discussing it with peers while also gain hands-on experience with technology-mediated collaboration. Students were assigned into groups by the lecturer. The participating groups were located in different rooms but within the same building for practical reasons. Learning tasks included case study analysis, decision making, and creation of joint artifacts (such as reports, flow charts, or diagrams). Students reconvened after each video-conference and a discussions session followed where the lecturer as well as other students provided feedback and suggestions to the participating groups. Each student group also had to create and maintain a blog. The learning objective of the blogging tasks was to encourage students to reflect on their understanding and report on their learning experiences and the skills and competences they developed during the lecture, the workshops, and through their subject-related reading. Students were encouraged to read other groups' blogs and comment on their peers' posts but the frequency of blogging was neither strictly prescribed by the lecturer nor formally assessed.

The students' behavior was observed both in the classroom and online. Due to the numerous variables and the complexity of the real-life setting being studied, the focus was not on differentiating on how individuals from different countries, academic backgrounds, or age groups engage; rather the aim was to identify the different forms of engagement which are prominent across individuals within the studied setting. More specifically, the focus was on the nature of the observed engagement behaviors and on the students' self-reports on how they engage and why.

### **3.2 Research Methods and Data Collection Methods**

The research method employed is a collective (Stake 1995), ethnographic case study. Philosophically, middle-range, mixed-methods research approaches value both qualitative and quantitative data collection methods. In this study, prolonged participant observation was enriched with additional data collected through in-depth, semi-structured focus groups; examination of students' blogs; photographic material and

video-recordings of students while participating in video-conferencing sessions, as well as student questionnaires. Follow-up interviews and informal discussions (with both students and lecturers) also complemented the collected evidence and helped to validate initial patterns emerging in the course of the research. Many scholars promote the knowledge produced by mixed-methods research approaches (Creswell & Plano Clark 2011; Johnson & Onwuegbuzie 2004; Tashakkori & Teddlie 2003, 2010).

The research design adopted in the study involved a number of iterations between inductive and deductive reasoning towards devising a coherent set of theoretical ideas (Onwuegbuzie & Teddlie 2003). Indeed, theoretical ideas and empirical insights were constantly informing each other in a stimulating and illuminating way. This iterative process is central to grounded theorizing whereby data are used to form tentative ideas or propositions which in turn inform further data collection, interpretation, and sense making (Hammersley & Atkison 2007). For instance, while some students said they usually prefer to learn in groups and that they learn best when working with others, their contribution on the blogs was limited. This observation motivated deeper investigation into what might create a discrepancy between what students say they prefer and what they actually do, rather than taking any of the two sources of evidence at face value. The opportunity to present divergent views would not be possible without the collection of diverse types of data (Tashakkori & Teddlie 2003). The selected research design permitted a deeper understanding of which combinations of factors or characteristics lead to different types of engagement with CSCL activities.

## **4 Data Analysis and Key Findings**

### **4.1 Analytical Framework**

Analyzing data in mixed-methods research is one of the most challenging steps of the research process (Onwuegbuzie & Combs 2010). The multiplicity of the data sources used in the study, coupled with the longitudinal nature of the research, has generated a great amount of rich data in different formats (words, numbers, photographic and video-recorded material). Therefore an analytical framework was devised for guiding data analysis. In this respect, NVivo® was a useful tool not only for coding data but also for managing ongoing analytical steps. Data analysis involved data reduction techniques (Creswell 2002; Namey et al. 2007) aiming at identifying the most dominant themes inherent in the data related to learner engagement. This approach intended to make sense of the actions and perceptions of the informants (Hammersley & Atkinson 2007). Specifically, the ways students reasoned about their engagement were compared and contrasted with the observed patterns of student engagement to strengthen the interpretation and description of the phenomenon of learner engagement. The emphasis was placed on understanding social action ‘in context’ that is, what learners do, how, and why within the selected milieu. Emergent themes were then classified into thematic categories and relationships between them were explored (Miles & Huberman 1994). The purpose of analyzing the collected data was to gain a deeper understanding of learner engagement in CSCL activities.

## 4.2 WISE Taxonomy of Learner Engagement Archetypes

The themes that emerged from the study can contribute to our understanding of how postgraduate students engage in CSCL activities. Learner engagement emerged as a three-dimensional concept which incorporates the ways in which postgraduate students (i) approach, participate in, or act upon a CSCL task (behavioral dimension), (ii) think about the task or reflect about the way in which they approach the task (intellectual dimension), (iii) feel when participating in the task (affective dimension).

During the higher-order analytical stages of the research, an attempt was made to evaluate and select a set of variables which could collectively help to operationalize the level of engagement across each of the three dimensions. This was deemed necessary following the prominent observation that an individual student may engage differently within each dimension. For example, a student may be emotionally neutral, appear to be deeply engaged intellectually, yet contribute moderately on the actual CSCL task. However, the process of defragmenting each dimension of learner engagement was by no means a straightforward endeavor. Following extensive analysis a total of nine variables (both subjective and objective) were selected in an attempt to capture the varying degrees of engagement in each dimension. The objective measures were collected quantitatively (e.g. counting the number of blog posts) or through questionnaires (e.g. ASSIST (CRLI 1997; Tait et al. 1998) and AMS (Vallerand et al. 1992)), while the subjective variables were based on students' self-reported data and observation of student behavior. Behavioral engagement was characterized by three attributes: one objective (total number of blog posts, comments, and replies) and two subjective (level of contribution in video-conferencing CSCL tasks, and level of involvement in supportive, back-end collaboration and coordination activities). Intellectual engagement was also characterized by three attributes: two objective (academic motivation and approach to studying) and one subjective (degree of self-awareness regarding the relation between learner engagement and learning outcomes). Finally, affective engagement was measured using a single subjective variable (student's expressed feelings). Two additional independent variables (learning preference and assignment mark) were also included based on the observation that they were helpful in discriminating between different patterns of engagement. Table 1 below summarizes the set of variables used for each dimension of learner engagement.

**Table 1.** Variables measuring behavioral, intellectual, and affective engagement

	Variable
<b>Behavioral</b>	1. Contribution on the blogs [passive (0-1 posts), moderate (2-5), active (>=6)]
	2. Contribution in video-conferencing tasks [passive, moderate, active]
	3. Involvement in back-end activities [passive, moderate, active]
<b>Intellectual</b>	4. Academic motivation (AMS) [amotivated, extrinsically or intrinsically motivated]
	5. Approach to studying (ASSIST) [surface apathetic, strategic, deep]
	6. Degree of student self-awareness [unaware, ignored awareness, consciously aware]
<b>Affective</b>	7. Expressed feelings [negative, neutral, positive]
<b>Additional</b>	8. Learning preference [solo, mixed, social]
	9. Assignment mark [fail (<50%), pass (50-64.9%), distinction (>=65%)]

Data analysis yielded illuminating insights and helped to cluster individual learners based on how they engaged behaviorally, intellectually, and emotionally. This clustering process revealed four distinct ways in which learners may engage with CSCL activities. These constitute the four engagement archetypes labeled 'Withdrawn', 'Impulsive', 'Strategic', and 'Enthusiastic – hence the taxonomy is entitled 'WISE Taxonomy of Learner Engagement Archetypes'. The chosen labels for the four archetypes are believed to be broadly representative of the students grouped under each category. The archetypes and their inherent characteristics are discussed below.

**Withdrawn Learner Engagement.** This archetype characterizes those students whose overall behavioral, intellectual, and affective engagement was low. These students demonstrated an overall passive behavior towards all CSCL activities. They also appeared to lack intrinsic motivation to learn and followed a surface, apathetic approach to studying. The fact that almost one in every four students (22%) appeared to be genuinely disengaged is definitely not an encouraging outcome especially given the fact that these are postgraduate students preparing for a professional career. Findings revealed that students in this category generally prefer to learn and study on their own. They seemed to consider CSCL tasks as requiring too much time and effort, and therefore failed to see the true value of CSCL activities towards their learning as postgraduate students and upcoming professionals alike. This was also reflected in their assignment marks which were significantly lower compared to all other learner engagement archetypes. Additionally, the expressed feelings coming from this group of students were predominantly negative, the most common of which included feelings such as of apathy, boredom, and cynicism.

**Impulsive Learner Engagement.** Although this was an unexpected profile, it emerged prominently in the studied context (19%). The reason it was unexpected relates to the fact that in general, solo learners have a natural inclination towards studying on their own rather than getting involved in collaborative learning tasks. Nevertheless, half of the students who considered themselves solo learners were actually active both on the blogs and in supportive collaborative activities. Although impulsive students appeared to be shy in face-to-face discussions and contributed moderately in video-conferencing tasks, they were generally active on the blogs and in back-end activities involving the coordination of group tasks or negotiation of intra-group roles. Blogging was considered by impulsive learners as an opportunity to contribute to the group, to be heard, to share their ideas. The web-based, asynchronous nature of blogs allowed students to take their time before contributing. It was these opportunities that motivated impulsive students to leave their comfort zone and actually start collaborating. In doing so they started appreciating the importance of CSCL in their learning and progressively became more aware of how collaborative learning can enhance their self-confidence and their learning experience. These findings also suggest that if blogging was not a part of their education it is quite likely that these students may have failed to share their ideas and get engaged with the learning content and their peers alike. This emphasizes the significance of CSCL activities and the role of social and situational factors affecting their engagement.

**Strategic Learner Engagement.** Although the majority of students in this category expressed a preference towards social learning, their overall engagement was moderate to low. Strategic learners appeared to be active in face-to-face discussions yet they tended to disregard and devalue CSCL tasks on the basis that these tasks did not count towards their overall assessment. Although some strategic learners posted some content on the blogs they did not engage actively neither they replied to comments from their peers or the lecturer. This indicates that their strategic/achieving approach to learning and studying interfered with their engagement. In a way, the assessment strategy was conducive towards disengagement. In some cases, their assessment-oriented approach forced them to withhold information which was obstructing collaborative learning. From a pedagogical point of view, this illuminates both the importance of selecting appropriate assessment strategies in the context of CSCL and the value that postgraduate students often assign to extrinsic motives. It also re-emphasizes how personal (e.g. approach to learning) and situational (e.g. pedagogical practices) aspects may affect engagement. This was the second most prominent profile (27%) that emerged in the study, following enthusiastic learners.

**Enthusiastic Learner Engagement.** Enthusiastic learners demonstrated the highest level of overall engagement and they constitute the most prominent archetype in the studied context (32%). In terms of their behavioral engagement, enthusiastic learners were not only regularly contributing new content on the blogs, but they also engaged in web-based discussions with their peers and their lecturer. Their natural enthusiasm and excitement was also evident during the video-conferences. Their classmates confirmed their eagerness to coordinate the group activities and encourage other group members. Intellectually, they appeared to be motivated to learn and share their views with others. They also associated their experiences with CSCL with feelings of excitement, enthusiasm, and satisfaction and made clear, explicit connections between their learning experiences with CSCL tasks and their expected learning outcomes.

## 5 Discussion and Implications for Practice

The study findings have a number of implications for the design of ‘engaging’ CSCL pedagogies. Initially, the findings reinforce what has been previously argued in the literature: the fact that engagement is a complex and multifaceted concept (Ainley 2004; Murphy & Alexander 2000). Furthermore, the findings suggest that in conceptualizing learner engagement in CSCL we need a set of constructs that have the capacity to encapsulate what students ‘do’ when they are engaged but also how they ‘feel’ and ‘think’ when they are engaged. Thus, theorizing learner engagement as a three-dimensional concept defined by behavioral, intellectual, and affective constructs is useful for two main reasons. Firstly, for understanding the ways in which postgraduate students engage in CSCL tasks and secondly, for appreciating that students engage at a different extent within each dimension. The three-dimensional conceptualization of learner engagement alongside the WISE Taxonomy of Learner Engagement Archetypes provide a set of ideas which can help to make sense of how it is that



postgraduate students engage with real-life CSCL activities and may, in turn, guide the design of pedagogical models for CSCL.

The findings seem to suggest that student engagement rests upon students' aptitude to intellectually, emotionally, and actively engage in the learning task but also illuminate the influence that personal and situational factors may have on students' actual engagement. Specifically, the taxonomy shows that some students may enthusiastically engage with a CSCL activity even if it does not constitute part of their assessed work, simply because it is itself a fulfilling activity. The taxonomy also reveals that students may be engaged or disengaged irrespective of their learning preference towards individual or social learning practices. Interestingly, however, many students may appear to strategically disengage from CSCL activities and as a result they may fail to appreciate CSCL as an authentic activity which leverages the opportunity to learn from and with each other, as well as from the wide range of digital resources openly available to them. Hence, in many ways, learner engagement appears to be analogous to the digital competences learners should acquire or cultivate through their education, such as the ability to learn and adapt quickly in the digital world, the confidence to effectively communicate and share information, and the ability to critically evaluate the vast amount of information available online. Viewing learner engagement with CSCL as a competence has implications for curriculum design indicating the importance of carefully selecting appropriate learning activities which are designed in a way that promotes collaboration and inspires students to learn how to approach learning tasks and how to engage with the learning content and with each other – through technology. All these constitute key elements towards cultivating learner engagement and developing the employability skills sought after in the modern workplace.

Furthermore, although lecturers usually expect postgraduate students to be highly self-motivated and self-directed, the intensity of most postgraduate degrees and the ever-increasing competition for jobs switches students' focus towards gaining higher grades. Apparently, adult learners are likely to "read, write papers, and discuss issues as long as they believe that these activities will help them achieve their goals" (Grabinger et al. 2007, p. 13). These findings have implications for student inclusivity suggesting that educators need to accommodate diverse types of engagement in their CSCL practices, not just diverse learning styles. They also highlight the fact that lecturers should consider students' ultimate goals and should not underestimate the importance of external triggers and incentives (Grabinger et al. 2007).

From a pedagogical perspective, the findings suggest that the adoption of CSCL practices will not automatically engage all learners. Various conditions or situational factors may enable or hinder learner engagement, such as the type of learning tasks, the assessment criteria assigned to them, the presence or absence of continuous feedback from the lecturer, the flexibility and openness in the learning process, and the dynamics in the student groups amongst others (Piki 2010). Understanding learner engagement from a holistic viewpoint – taking into consideration not only what students do, but also how they feel and think when approaching a CSCL activity – can be a challenging-yet-illuminating exercise that can help both students and educators to envisage the benefits of CSCL.

## 6 Limitations and Further Research

One potential limitation of the study may be the fact that it draws heavily on subjective measures such as observations of students' behaviors and students' self-perceptions. Future research may address the degree to which objective measures (e.g. age, gender, academic or cultural background) are correlated with the engagement strategies adopted by postgraduate students. Furthermore, the elicited archetypes of learner engagement were identified in a specific CSCL context, with a particular group of participants registered in a particular postgraduate course in the UK. While it is possible that instances of these archetypes may be present in other contexts (educational and/or vocational), this remains to be further explored. Another potential extension to this research would be to validate the proposed taxonomy across different CSCL contexts which employ different CTs (such as wikis, electronic forums, online argumentation tools, and social networking sites). Further research is also needed to better understand the multitude of personal, social, and situational factors that may enable or hinder learner engagement – in higher education and in the workplace alike.

## 7 Conclusion

The findings from this mixed-methods study suggest that although some students may naturally and enthusiastically engage in CSCL activities, learner engagement should not be taken for granted. Put differently, learner engagement should not be considered as an inherent feature of CTs. A more beneficial approach would be to consider learner engagement as a competence which can be nurtured through the application of coherent pedagogical models and assessment strategies taking into consideration not only how students prefer to learn but also how students are likely to engage in CSCL activities, and why. Although the value of CSCL practices is widely established, ensuring high quality learning outcomes are achieved requires empowering student engagement with the CSCL tasks and developing their skills and competencies through collaboration and knowledge sharing. This can be an attempt towards more engaging computer-supported collaborative learning journeys.

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