The role of academic motivation in Computer-Supported Collaborative Learning

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ABSTRACT

In recent years, increasing attention has been devoted to virtual learning. In the last decade, a large number of studies in Computer-Supported Collaborative Learning (CSCL) have assessed how social interaction, learning processes and outcomes in virtual settings are intertwined. Although recent research findings indicate that learners differ with respect to the amount and type of discourse contributed in virtual settings, little is known about the causes of these differences. The research presented here looks into the effects of motivation of learners on their contribution to discourse using the Deci and Ryan framework of (intrinsic/extrinsic) motivation.

This study of 100 participants who were randomly distributed in six groups of 14 members collaborated in a virtual setting to remediate deficiencies in economics indicates that individuals differed with respect to the amount of discourse activity. Furthermore, an integrated multi-method approach (Content Analysis, Social Network Analysis and Academic Motivation Scale) was used in order to examine the impact of academic motivation on the type of discourse activity contributed and on the position of the learner in the social network. The results indicate that highly intrinsically motivated learners become central and prominent contributors to cognitive discourse. In contrast, extrinsically motivated learners contribute on average and are positioned throughout the social network. The research results reveal that differences in academic motivation influences the type of contributions to discourse as well as the position a learner takes within the social network.

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1. Introduction

Recent findings in Computer-Supported Collaborative Learning (CSCL) indicate that learners contribute differently to discourse (Caspi, Chajut, Saporta, & Beyth-Marom, 2006; De Laat & Lally, 2003; Häkkinen & Järvelä, 2006). For example, Caspi, Gorsky, and Chajut (2003) analysed a total of 7706 messages of 47 courses at various faculties of the Open University in Israel and found that the majority (80%) of students contributed only a small amount (20%) of messages. But not only differences in the amount of contributions by students have been found. For example, De Laat and Lally (2003) showed that students in an online E-learning Master's programme also differed with respect to the type (cognitive, affective, metacognitive) of contributions. In a bachelor's freshman course of educational science, Schellens and Valcke (2005) found significant differences with respect to both amount and type (social, cognitive) of discourse.

Although recent research findings indicate that learners differ with respect to the amount and type of discourse contributed, little is known about what the causes of these differences are. Within the field of Computer-Supported Collaborative Learning, researchers try to understand what the underlying reasons for a lack of contributions to cognitive discourse are and how to solve them. For example, Lowry, Roberts, Romano, Cheney, & Hightower (2006) found that informatics learners who in an experimental design collaborated in class and were complemented with ICT established higher levels of communication quality than learners who collaborated only virtually. Hurme and colleagues (2007) analysed the interaction patterns among secondary school children who worked online in pairs on mathematical problems. Metacognitive activity varied among participants, which subsequently influenced the interaction among pairs of learners. Furthermore, by using Social Network Analysis some pairs became central contributors to discourse, while others were less active and were positioned on the outer fringe of the social network (Hurme et al., 2007).

Recently several researchers have investigated the role of motivation in CSCL. For example, by measuring goal-oriented motivation (Pintrich & De Groot, 1990), Yang, Tsai, Kim, Cho, & Laffey (2006) found evidence that motivation is positively related with how learners perceive each other's presence in online courses. Järvelä and colleagues (2008) found that students who were working together in groups of 3–5 students reported more (favourable) learning goals and fewer performance goals in the face-to-face

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setting than students in virtual groups. Besides goal-oriented motivation, several other factors might influence motivation like the degree of self-determination of learners (Ryan & Deci, 2000a; Ryan & Deci, 2000b). For example, in an online setting learners have a large autonomous freedom and can decide their own learning path, which might be beneficial for learners with intrinsic motivation (Ryan & Deci, 2000b; Vallerand & Bissonnette, 1992). In addition, the limited role of the teacher in a distance learning constellation (Kirschner, Strijbos, Kreijns, & Beers, 2004; Vonderwell, 2003) refrains the teacher to interact in a similar manner as in a face-to-face setting. A teacher can directly provide instruction, feedback and coaching in a face-to-face setting, which should help learners who are in need for external regulation (Roth, Assor, Kanat-Maymon, & Kaplan, 2007). In an online setting, the lack of regulation might limit the responses from extrinsically motivated learners.

The research presented here looks into the effects of differences in academic motivation (i.e. intrinsic/extrinsic/a-motivation) of learners on their contribution to discourse. Although recently an increasing number of researchers have analysed the role of motivation in CSCL settings in a qualitative manner, to our knowledge no quantitative study exists that analyses how differently motivated learners behave in an online learning environment. Therefore, we will investigate to what extent differences in individual contributions to discourse are explained by differences in academic motivation. As recommended by recent research (De Laat, Lally, Lipponen, & Simons, 2007; De Wever, Schellens, Valcke, & Van Keer, 2006), we will use a multi-method approach composed of Content Analysis, which measures the type of discourse activity, and Social Network Analysis, which measures the interaction processes among learners. Afterwards, we will integrate the type of contributions to discourse with the position of each individual learner in the social network and finally link this to his/her type of motivation. In this way, we attempt to assess to what extent differently motivated learners vary in the type of discourse contributed in online settings.

1.1. Importance of motivation for learning

Motivation has an important influence on a learner's attitude and learning behaviour (Deci & Ryan, 1985; Fairchild, Jeanne Horst, Finney, & Barron, 2005; Ryan & Deci, 2000a; Vallerand et al., 1992). "Motivation has been a central and perennial issue in the field of psychology, for it is at the core of biological, cognitive and social regulation" (Ryan & Deci, 2000b, p. 69). As motivation is a multidimensional and multilevel construct (Boekaerts, 1997), a wide variety of definitions and instruments are discussed and used in educational psychology research. We adopt the concept of motivation developed by Deci and Ryan (1985), where "[t]o be motivated means to be moved to do something", as the degree of self-determination of learners might explain why some learners contribute more to discourse in CSCL than others. According to Ryan and Deci (2000a, 2000b), most theories of motivation regard motivation as a unitary phenomenon, implying that a learner has either a lot or little motivation, also referred to as motivation versus a-motivation. To be motivated means to be moved to do something, while a-motivation is a state of lacking any intention to act (Ryan & Deci, 2000a). However, focusing only on the level of motivation ignores the underlying attitudes and goals the learner has in order to pursue an action or goal (Deci & Ryan, 1985). In Self-Determination Theory (SDT), Ryan and Deci (2000a, 2000b) distinguish between intrinsic motivation, extrinsic motivation and a-motivation.

In intrinsically motivated learning, the drive to learn is derived from the satisfaction and pleasure of the activity of learning itself; no external rewards come in play. According to Ryan and Deci (2000a, p. 56), intrinsic motivation is "... a critical element in cognitive, social, and physical development because it is through acting on one's inherent interests that one grows in knowledge and skills". In a subtheory of SDT, Cognitive Evaluation Theory (CET), social and environmental factors play an important role in determining what facilitates and what hinders intrinsic motivation. More specific, in SDT feelings of competence and social relatedness in combination with a sense of autonomy (defined as basic psychological needs) are important facilitators for intrinsic motivation to occur, to maintain and to enhance.

Externally motivated learning refers to learning that is a means to an end, and not engaged for its own sake. In contrast to classical theories of motivation that regard extrinsic motivation as a single construct, SDT proposes that extrinsic motivation is a construct with different facets that vary greatly with the degree to which the learner is autonomous (Deci & Ryan, 1985; Ryan & Deci, 2000a). That is, besides intrinsic motivation and a-motivation, SDT distinguishes four different forms of extrinsic motivation that constitute a motivational continuum reflecting an increasing degree of self-determined behaviour, namely external regulation, introjection, identification and integration (Ryan & Deci, 2000a).

As most educational learning settings are externally regulated, a crucial question is how to internalise and to integrate educational activities for learners (Deci & Ryan, 1985). "Internalisation is the process to taking in a value or regulation, and integration is the process by which individuals more fully transform the regulation into their own so that it will emanate from their sense of self" (Ryan & Deci, 2000a, p. 60). When learners internalise their reasons for showing a given behaviour, learners become more self-determined (Legault, Green-Demers, & Pelletier, 2006). Three factors in SDT enhance the internalisation of regulation, namely relatedness, perceived competence and autonomy (Deci & Ryan, 1985). The more a learner perceives a sense of belonging and connectivity to other learners (relatedness), the more willing learners are to show the behaviours that are externally regulated (Legault et al., 2006). In addition, a learner can only adopt an extrinsic goal when the learner feels he or she is competent to achieve this goal. Finally, in order to fully internalise a regulation, a learner must autonomously value its meaning and worth (Ryan & Deci, 2000a).

In a long series of over 700 studies in classroom settings, the model of Deci and Ryan (1985) has been empirically verified (Ryan & Deci, 2000a, 2000b). For example, more autonomous extrinsic motivation has been found to lead to greater engagement, less dropping out (Legault et al., 2006), higher quality learning and greater psychological well-being (Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Ryan & Deci, 2000a). Greater internalisation yields more behavioural effectiveness as well as greater experienced well-being (Ryan & Deci, 2000a).

Vallerand and colleagues have added further theoretical concepts to the model of Deci and Ryan (1985) by acknowledging that the attitudes, values and goals that trigger a learner to become intrinsically motivated can differ when a learner enters into college or university and voluntarily chooses a study. For example, some students might choose to study economics as they enjoy learning a new science, some might choose economics in order to understand the underlying reasons of an economic crisis, while others might choose economics as playing a manager in a virtual game during a management course seems exciting. Therefore, Vallerand et al. (1992) distinguish between three intrinsic motivation types: intrinsic motivation to know or learning for the satisfaction and pleasure to understand something new; intrinsic motivation to accomplish or learning for experiencing satisfaction and pleasure to accomplish something; and intrinsic motivation to experience stimulation or learning to experience stimulating sensations.

1.2. Role of motivation in CSCL

Several researchers have found that learning in CSCL settings is more complex than in face-to-face settings. For example, Schellens