The role of work-based learning for student engagement in vocational education and training : an application of the self-system model of motivational development

**The Role of Work-based Learning for Student Engagement in Vocational Education and Training: An Application of the Self-system Model of Motivational Development**

*Abstract*

*Educational policy strategies give work-based learning (WBL) and dual learning pathways a prominent role in strengthening student engagement. Given this mounting policy attention, the current study aims to fill a knowledge gap with regard to the relation between WBL and student engagement, particularly within the context of dual pathways combining school- and work-based learning. To this end, we situated student engagement in the wider motivational framework of the Self-System Model of Motivational Development (SSMMD) to help theorise its antecedents in students' learning contexts and psychological self-system processes. The main purpose of this study was to test the hypotheses based on the SSMMD within a WBL context and to relate student engagement in WBL to engagement in school-based learning. As most measurements of the elements making up the SSMMD were validated within a school-based learning context, we used confirmatory factor analyses to test the measurements transferability to a WBL context. Our findings show the relevance of applying the SSMMD to the context of WBL, hereby confirming the facilitating or inhibiting role of a WBL context in fulfilling the basic psychological needs of needs of autonomy, relatedness and competence., which in turn supports engagement in WBL. Our findings also show the potential to study work- and school-based learning as two interrelated learning contexts, stimulating researchers, policy makers and practitioners to further study and invest in dual learning pathways that purposefully combine learning in school- and work-based contexts.*

*Keywords: Work-based Learning; Student Engagement; Self-System Model of Motivational Development; Structural Equation Modelling.*


**Introduction**

In the past decade Vocational education and training (VET) became one of the European Commission's main strategies for tackling early leaving of education and training (Cedefop 2016; EU Commission 2015). A key element in this strategy is the encouragement of member states to include preventing early leaving in VET in their policies, as well as compensating for this phenomenon in general education by attracting, retaining and reintegrating students through VET (Eurydice and Cedefop report (2014). Within these policy recommendations,

the (further) development of work-based learning (WBL) is outlined as a crucial aspect of VET. The promotion of WBL in all its forms but with a focus on dual learning pathways that combine school- and work-based learning became one of the key priorities for the European Commission's Education and Training 2020 targets (EU Commission 2015).

Despite the increasing policy interest in the role of work-based learning in tackling early leaving from education and training, little research investigated to what extent dual VET pathways can be effective. The underlying assumption is often that WBL provides an alternative learning pathway that can support student engagement in learning (Keskiner & Crul 2018). As research repeatedly showed its relation to positive learning outcomes, the concept of student engagement is therefore of particular interest (Fredericks et al. 2004; Rothermund 2010). As Reeve et al. (2004, p. 147) argue engagement concerns a person's active involvement during a task, and is based on one's behavioural intensity and emotional quality (Reeve et al. 2004, p. 147). Many scholars also showed that decreasing levels of student engagement predict early leaving from education and training, in particular in secondary education (e.g. Lamote et al. 2013; Lam et al. 2016; Rothermund 2010). Crucial in grasping these phenomena is to understand student engagement as a process by which students can gradually disconnect from education and is consistent with the idea that early leaving of education and training (ELET) is often an endpoint of such a process (e.g. Finn 1989). There is some discussion in the literature on the number and nature of dimensions within student engagement. While the conceptualisation shows consensus in distinguishing at least between an emotional and a behavioural dimension (Appleton et al. 2008), other scholars add a cognitive dimension (e.g., Fredricks et al., 2004). Furthermore, some literature theorises engagement and disengagement as two opposites of the same continuum, while other scholars distinguish between positive and negative engagement features. The latter distinction is based on the argument that disengagement (termed disaffection in this strand of literature) conceptually covers more than just a lack of engagement (Chipchase, et al. 2017; Jimerson et al. 2003; Skinner et al. 2008). In this paper, we distinguish between the behavioural and emotional dimensions of student engagement, in which the behavioural dimension is operationalised as (negative) disaffection and the emotional dimension as (positive) engagement. In the remainder of this paper, however, we use student engagement as the overarching concept that will be disentangled where this is appropriate.

Moreover, the current paper focusses on student engagement in the context of dual learning and we build on the wider motivational framework of the Self-System Model of Motivational Development (SSMMD) to help theorize the antecedents of student engagement in students' work-based learning context and self-system processes (i.e. perceived competence, autonomy and relatedness) (Connell and Welborn 1991, Skinner et al. 2008). We take

this perspective as scholars previously showed that student-centred educational approaches are effective in promoting student engagement (Gasiewski et al. 2012). Due to the growing interest in promoting student engagement in Science, Technology, Engineering and Mathematics, this has been investigated in particular within this context (authors, 2019a). It is argued that WBL can also offer a strong student-centred teaching and learning approach, in particular when the mentor at the workplace takes on a 'coaching role' and the focus is on the learning process (Anderson 2007; Brush & Saye 2000). The current paper aims to elaborate on this theoretical assumption and studies the potential of WBL in strengthening student engagement and reducing ELET.

This focus is particularly interesting in education systems that design and implement new policies to tackle low levels of engagement and early leaving. The case of the Flemish education system is in that sense quite relevant, also to other education systems, as recently the Flemish Government (2015) implemented a new dual VET system that (amongst other policy objectives) explicitly aimed to reduce the number of early leavers in Flemish VET[1] by providing an alternative learning pathway. This new trajectory is presented as a positive alternative for students that show low levels of engagement in school-based learning (Authors 2017). The policy reform aims to provide more students with higher quality dual learning VET options by reforming two separate systems of learning and working, *i.e.* the part-time work-based VET and the apprenticeship track that together represented less than 5% of all students in Flemish secondary education, into a new dual learning pathway. In this new dual learning system, regular secondary schools can program dual learning courses, rather than only the specific training centres in the already existing systems. From September 2016, the dual learning system was first implemented as a pilot and expanded to increasingly more schools and from September 2019 onwards it is implemented as a new learning pathway across Flemish secondary education (EU Commission 2018).

As dual VET systems have mostly institutionalised stronger linkages between school- and work-based learning contexts when compared to more school-based VET systems (Rözer & van de Werfhorst 2020), dual VET can offer students alternative learning content and methods that are more attractive to young people who are less interested in academically oriented school-based education (Cedefop 2016). As work-based learning is premised to have positive effects on student engagement, this ultimately should contribute to decreasing ELET figures. Yet, in some EU member states ELET figures are higher in VET tracks that combine school- and work-based learning, as is the case for the original systems for combining learning and working in Flanders (*i.e.* part-time work-based VET and the apprenticeship track). This can, however, attributed at least in part to a selection effect in which such

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[1] In the school year 2015-2016 10, 3% of the students in Flemish secondary education left without attaining an upper secondary level qualification. Early leavers were 7 times more likely to leave from full-time school-based VET and 23 times more likely to leave from part-time (work-based) VET than from general secondary education (Flemish Ministry of Education and Training 2018).

VET programs – which is common for countries where dual VET is not the dominant VET type – attract more students who, due to their sociodemographic and educational career background, are more at risk of ELET (Authors 2020). Cedefop (2016) concluded that this does not challenge the effectiveness of work-based learning but rather advocated to invest in additional supportive measures that address the needs of learners who are at risk of early leaving from education and training, as they are often overrepresented in VET.

Inspired by the new educational policy initiative discussed above, our empirical research investigates the role of WBL in strengthening student engagement in Flemish VET pathways that combine school- and work-based learning. To this end we will present a conceptual framework that takes into account context variables (including both task-based learning opportunities as well as interactional support from teachers, mentors and colleagues on the workplace), micro-level factors related to the self (i.e. perceived autonomy, relatedness and competence) as well as to one's engagement in learning (i.e. emotional and behavioural engagement and disaffection). Before going into more details about the goal and hypotheses guiding our study, we first present and discuss the conceptual framework of our study.

**Theoretical Background**

From the perspective of the prevention of early leaving from education and training, the conceptualization of student engagement as a process enables researchers to grasp the interrelatedness of the cognitive, emotional and behavioural dimensions of engagement in predicting educational outcomes (Fredricks et al. 2004; Janosz et al. 2008; Lam et al. 2016; Wang et al. 2011). In contrast to more fixed risk factors such as students' sociodemographic or educational background characteristics, schools and educational professionals need to be able to detect early signs of decreasing engagement or disaffection to design strategies to reduce the risk of students dropping out prematurely. Student engagement is therefore a central concept for prevention and intervention because it shifts attention to more alterable attributes in the prevention of ELET (Appleton et al. 2008; Authors 2019b; Christenson & Thurlow 2004).

However, to design effective prevention and/or intervention programs, one needs an in-depth understanding of the nature and antecedents of the school engagement construct. First, it is important to recognize student engagement as a multidimensional and dynamic concept (Fredricks et al 2004). This implies on the one hand the focus on observable indicators of positive and negative behavioural engagement (e.g. sustained attention, number of suspensions) with, on the other hand, more covert emotional and cognitive engagement dimensions that refer to

psychological indicators (e.g. sense of school belonging or the use of cognitive strategies) (Appleton et al. 2008; Wang et al 2011).

While the relevance of the student engagement construct is widely acknowledged in the prevention of early leaving from education and training (*e.g.* Lamote et al. 2013; Lam et al. 2016; Rothermund 2010), the construct as such does not incorporate antecedents of engagement in students' social and learning context, nor its relations to other psychological variables in educational research (Appleton et al. 2008; Skinner et al. 2008). Therefore, this paper elaborates upon motivation theory and more in particular the Self-System Model of Motivational Development (SSMMD) which allows situating student engagement in a broader motivational framework and brings it into relation with antecedents in the learning context and psychological processes (Connell & Wellborn 1991; Skinner et al. 2008).

### *Studying student engagement within a broader motivational framework*

The complexity of how student engagement as a process is related to antecedents in students' learning context and self-system processes is well captured by the wider motivational framework of the SSMMD (Authors 2019b; Connell & Wellborn 1991; Skinner et al. 2008). Indeed, the presence of motivation is a necessary condition, but on itself not sufficient, to engagement (Appleton et al., 2008). Engagement is mainly concerned with one's active involvement in a task or domain, while one's motivation illuminates the reasons *why* a person is engaged. The comprehensive framework of the SSMMD enables researchers to understand how engagement occurs by relating it to underlying motivational processes and taking into account interactions with one's social context. In so doing, the SSMMD captures the intra-individual as well as the interindividual processes which have been shown to influence student engagement in school-based learning (Authors 2019b; Connell et al. 1994; Skinner et al. 2008; Skinner et al. 2009).

The self-system model (Connell and Wellborn 1991) and self-determination theory (Deci & Ryan 1985) provided the fundament to develop the SSMMD framework. The former two theories start from the basic idea that all individuals need to satisfy three basic psychological needs: individuals' need to feel competent, autonomous and related steers their motivation and engagement in a certain domain (Connell & Wellborn 1991; Skinner et al. 2008). The self-determination theory distinguishes between different types of motivation individuals could, showing a range from a-motivation over extrinsic to intrinsic types of motivation. The SSMMD adds to these insights by theorizing how motivation can be connected to the social context. To illuminate these processes scholars have developed the notion of self-system processes (Connell and Welborn 1991; Reeve 2012; Skinner et

al. 2008). The basic argument is that one's motivation and engagement in a certain domain or task is influenced by the perceived level of (1) competence, (2) autonomy and (3) relatedness in relation to that domain or task (Connell and Welborn 1991; Reeve 2012; Skinner et al. 2008). A crucial addition made by the SSMMD is that a student's learning context can present facilitators or inhibitions in trying to satisfy the three psychological needs. Therefore, to fully grasp these processes it is important to acknowledge the influence of interactions with others (e.g. teachers, mentors and colleagues) in the given educational context, also taking into account the limitations and opportunities present in one's surrounding context.

While the abovementioned processes can be applied to different domains, in this paper we argue it is also relevant for the domain of education. In the latter, perceived competence refers to the notion of feeling *competent* and having *control* on how to do well in learning (Skinner et al. 1990). Secondly, individuals also have a need to experience a sense of *relatedness*; with on the one hand, feeling connected to others in the learning context and, one the other hand, to have a sense of belonging to the school or, in terms of WBL, the workplace (Connell and Welborn 1991). Finally, perceived *autonomy* refers to the perception that one is the source of one's own behaviour (Deci & Ryan, 2002). Thus, in a learning context, when students feel that their engagement is not an external obligation they have to fulfil but a consequence of their own choice and interests, they will experience more autonomy (Stroet, Opdenakker, & Minnaert, 2013).

In elaborating on this need of feeling autonomous, a connection can be made with self-determination theory. This theory differentiates the quality of motivation in terms of controlled motivation on the one hand and autonomous motivation on the other. The former group of students find their motivation in factors more external to the self, while the latter group is more intrinsically than externally driven, in which for instance enjoyment of the task can be important lever for their engagement. The current state of the art argues there are various types of regulatory styles based on extrinsic motivation (e.g. Deci & Ryan 2002); however, in this paper we elaborate on the least extrinsic position on the self-determination continuum, namely identified regulation that is a component of autonomous motivation. Identified regulation is one of the most sustainable forms of extrinsic motivation as it concerns the perceived importance of a task or domain for one's personal future. Identified regulation is therefore relatively autonomous and in this sense conceptually close to intrinsic motivation. Scholars have also combined items from both these types of motivation into a comprehensive notion of autonomous motivation (*e.g.* Vansteenkiste et al. 2006), as will be the case in this study.

In a learning context, teachers and parents providing structure and autonomy support, as well as showing involvement, are some of the most important social support factors (Connell & Welborn 1991; Authors 2018;

Sierens et al. 2009). Structure support (1) entails articulating clear expectations for performance and positive performance feedback, but also providing optimal challenges; autonomy support (2) concerns the opportunities students have to choose their goals and the freedom parents and teachers grant them in this process; and with respect to involvement (3) this refers to positive affection and interest others show in student's school life (Connell and Welborn, 1991).

The current state of the art strongly supports the intertwinement of relations between context, self and engagement, as hypothesised by the SSMMD (e.g. Authors 2019b; Black and Deci 2000; Reeve et al. 2004; Skinner et al. 2008; De Loof et al. 2019). Rotermund (2010) showed how student's sense of school belonging, valuing of education and perceived competence in school are antecedents to student engagement. Moreover, engagement proved to be a strong mediator between the self and the act of dropping out. Fall and Roberts (2012) made clear that students' perceived control and identification with school depends on students' perceptions of teacher and parental support. Moreover, increased control and identification increased students' behavioural engagement and predicted a lower chance of dropping out. Finally, as will be discussed more elaborately below, the model of the learning potential of the context (e.g. the workplace or the school) enables researchers to grasp the opportunities that may be present (or not) in the learning context of students and could have an impact on their engagement (Nikolova et al. (2014).

In sum, the SSMMD can build on a strong scholarly tradition and empirical support for explaining student (dis-)engagement and early leaving in the context of school-based learning. In the next paragraphs, we will explore the state of the art concerning the added value of the SSMMD in the context of work-based learning.


***The SSMMD in the context of work-based learning***

While work-based learning is a well-integrated and strongly developed learning pathway in various education systems around Europe, such as Germany and Denmark (Cedefop 2016; Rözer & van de Werfhorst 2020), our literature review only rendered a limited number of studies where the SSMMD has been specifically applied to the context of WBL. Next to extensive scholarly works on the SSMMD in the context of school-based learning, there exists a body of literature studying the role of the SSMMD in the context of work and organizational psychology (*e.g.* Latham & Budworth 2006; Van den Broeck et al. 2008). Many studies empirically supported the importance of the psychological needs satisfaction hypothesis underlying both the self-system model and the self-determination theory with regard to work engagement. Schaufeli and Bakker (2004) showed that the job resources in the work context influence work engagement and linked the available job resources to the satisfaction of the

basic psychological needs. Van den Broeck et al. (2008) found direct empirical evidence for the psychological needs satisfaction hypothesis and the importance of job resources for explaining work engagement. However, not much research is available specifically with regard to *learning* in a work-based context, and even less so in terms of dual VET pathways that combine school- and work-based learning. We will now explore some of the existing literature that links student-centred learning approaches in a WBL context to psychological needs satisfaction and student engagement in WBL.

In the field of studying engagement in the context WBL, scholars draw attention to the differences between work-based and conventional school-based learning. To meet challenges of learning outside of traditional educational institutions, Inceoglu and Shukla (2011) indicated that students need higher levels of self-determination (autonomy) and self-sufficiency (competence) to learn in a WBL context. The often more learner-centred pedagogy in WBL encourages students' ownership of their learning, hereby contributing to student engagement. Nonetheless, the authors also indicated that educational institutions should provide learning resources that support students to understand learning standards and norms (structure support), linking both the school- and work-based learning contents. The workplace – on the other hand – needs to facilitate student engagement by providing more emotional support (involvement). Moreover, the importance of student ownership is stressed and shows a strong correspondence with the role of autonomy in the SSMMD. The study suggests that student ownership of learning is vital to student engagement and that the relevance of the course is an important facilitator of this ownership, which is claimed to be particularly relevant for WBL. In the current paper, we include this focus on fostering ownership – or at least the related notion of perceived autonomy – by studying if and how the WBL context can foster students' autonomy both in terms of the learning process (e.g. through opportunities for experimentation and reflection), as well as through interactional support from teachers, mentors and colleagues.

Inspired by the self-determination theory, Kenny et al. (2010) showed that contextual characteristics in WBL, *i.e.* autonomy support from teachers and supervisors at the workplace, facilitate the achievement motivation of students. Messmann and Mulder (2015) provided evidence for the fact that the complexity of tasks in the workplace (linked to the optimal challenge aspect of structure support), autonomy support and the involvement of significant others at the workplace facilitates student engagement in WBL in the context of VET. However, Messman and Mulder (2015) did not test the mediation through students' self-system processes, which limits our understanding of how the WBL context influences student engagement. Our current study aims to test these self-system processes in the context of dual learning VET pathways.

With regard to the role of the learning context in supporting student engagement WBL, this paper largely builds on Nikolova et al. (2014) who developed a measurement model for the 'Learning Potential of the Workplace' (LPW). The learning potential of the workplace measurement model distinguishes between subdimensions for measuring interactional and task-based learning support in a work-based learning context. For interactional learning, Nikolova et al. distinguished between learning from the supervisor and learning from colleagues. With regard to task-based learning support learning Nikolova et al. (2014) differentiate between a cognitive reflection dimension, and a more behavioural dimension, the latter incorporating that, in order to learn, an individual engages in exploration and experimentation. Related to the SSMMD, the measurements for perceived support from the mentor and colleagues do not distinguish between items that specifically relate to structure and autonomy support, nor emotional involvement. However, construct validity testing by Nikolova et al. (2014) showed that the measurements of opportunities for learning through reflection and experimentation are strongly correlated to perceived autonomy.

In terms of linking student engagement in both work- and school-based learning in a dual learning pathway, Allan (2014), similarly to this study, addresses the policy objective of raising achievement by introducing WBL as an alternative pathway for dealing with disaffection towards school. The qualitative study concluded that among students that experience disaffection, WBL could support a more positive orientation towards learning in general. With regard to engagement in school-based learning, however, the study indicated that disaffection towards school could evolve when students are completely removed from the school context. The authors, therefore, recommended that – in order to tackle disaffection from school – vocational education that includes work-based learning should allow students to keep a positive connection with the school context.

The latter finding puts to the forefront the question of how student engagement in WBL relates to engagement in school-based learning. A qualitative study by Baartman et al. (2018) showed that students recognise the importance of vocational knowledge learned in school-based learning environments while they are in the workplace and that WBL also changed the way they learn at school by making them aware that they need occupational subject knowledge. However, this requires students to be able to continuously contextualise knowledge to make it applicable for the different circumstances in the school- and work-based learning contexts. The study stressed that students need to be supported in their capacity to connect practical knowledge engaged with in WBL to wider systems of meaning in school-based learning. Based on these two studies on the relation between school- and work-based learning, we can expect work-based learning experiences to have a positive

impact on student engagement in school-based learning (and vice versa), as far as this process is sufficiently supported by teachers and the supervisor in the workplace.

Figure 1 presents the conceptual model of the SSMMD as presented in this theory section and includes the main concepts at the contextual, self and engagement level when regarding a WBL context. As schoolteachers are also involved in the WBL process, at least by linking school- and work-based learning, teacher support is also included in the model.

*** *Figure 1: Conceptual Model of the SSMMD in a WBL context* ***

**Purpose of the study: applying the self-system model to student engagement in work-based learning**

What became clear while reviewing the existing literature on student engagement and the SSMMD was that most literature is grounded either in research on conventional school-based education with little attention for the learning aspect of WBL, or in studies conducted in the field of work and organisational psychology with a strong focus on the policy on learning rather than on learning itself. Given the growing policy attention for the work-based and dual learning pathways, particularly in tackling ELET, the literature shows an important knowledge gap with regard to the application of the student engagement construct and the wider motivational framework of the SSMMD with regard to dual pathways that combine school- and work-based learning. This study therefore seeks to test the hypotheses based on the SSMMD to a WBL context and relates student engagement in WBL to engagement in school-based learning (see figure 1). More specifically, we aim to study (a) how students' engagement in WBL relates to engagement in school-based learning; (b) how perceived support in the learning context relates to self-system processes in WBL; (c) how self-system processes relate to engagement in WBL; and (d) if and how the learning context affects student engagement in WBL. Structural equation modelling (SEM) will be used to test the structural relations hypothesised by SSMMD. However, as most of the measures for perceived learning support, competence, autonomy, relatedness and engagement were validated within a school-based learning context (e.g. Authors 2019), we use confirmatory factor analyses to test to what extent the applied measurements in this study are transferrable to a WBL context. Before reporting our findings, we first discuss the sample, measurements and analyses method in detail.

**Methodology**

*Participants and procedure*

This study is based on survey data collected in the pilot schools for the new dual learning system in Flemish secondary education during academic year 2018-2019. The survey data were collected from students in the dual learning pathways and non-dual VET reference pathways (*i.e.* pathways that provide access to the same educational/VET qualifications). The pilot schools are regular (predominantly) VET oriented secondary schools, centres for part-time secondary education, as well as centres for entrepreneurial training (so-called Syntra training centres, (Syntra, 2021)). The data used for the study are restricted to students with a significant proportion of WBL experience (n=311), *i.e.* students in the dual learning pathways as well as students in the reference courses in the apprenticeship track and those students in part-time work-based VET that managed to find a work placement. The age limit for this student population is legally set between the ages of 15 and 25 by the Flemish government.

All pilot schools were approached to participate in the survey and over 75% of the pilot schools participated. At the student level, within participating pilot schools, 81% of the students participated in the survey that was conducted during class hours and under the supervision of a teacher. An analysis of the non-response compared to administrative data about the student population in the pilot schools showed no clearly distinguishable patterns of selection bias with regard to school nor student level characteristics.

*Measures*

The survey data used for this study measure the latent constructs that are key within the SSMMD model (see figure 1) and include psychometric measurements of perceived support in the WBL context, students' self-system processes in WBL (*i.e.* perceived autonomy, relatedness, competence and control), as well as behavioural disaffection and emotional engagement indicators for both school- and work-based learning. However, for both the school- and work-based learning contexts, we only had access in the data to a (positive) engagement factor for the emotional dimension and a (negative) disaffection factor for the behavioural dimension. Latent variables measuring the SSMMD factors are based on previously validated scales. However, most had to be adapted from a school-based to a WBL context. Because the adaptations of the original school-based scale items concerned a reformulation of the phrasing to WBL, we will validate to what extent the measures also uphold in a WBL context using confirmatory factor analyses (CFA). Before reporting on the results of the CFA in the findings section, we first report on the origin, adaptation and reliability of the latent constructs used in the study. Table 1 presents the details of the measures used in this study, *i.e.* the references to the original scales, original and adapted example items and the alpha values from the reliability testing of the constructs using our data. All scale items are scored on a five-point Lickert scale and allowed responses ranging from "completely disagree" to "completely agree".

We note that where the latent constructs are limited to two items (*i.e.* the behavioural disaffection measurements), this was also the case in the original scale (Wang et al. 2011). The autonomous motivation scale we use – derived from a broader measurement scale for academic motivation (i.e. valuing education, Wang et all. 2011) – only contains the original items for intrinsic motivation and identified regulation. Other removals of original items were primarily made to reduce the length of the questionnaire for this particular student population. The selection for the omittances were based on the lowest factor loadings in previous studies by the authors (e.g. Authors 2019b; 2020). Most reliability scores mounted to a Cronbach alpha value over .7, while the measurements for perceived competence and control slightly drop below the .7 threshold when transferred to a WBL context. The CFA for these two latent concepts provided clear evidence for their construct validity.

\*\*\* Table 1 about here \*\*\*

*Analyses*

Prior to testing the structural relations hypothesised by the SSMMD using SEM, we tested if the construct validity of the SSMMD – previously validated in a school-based learning context (*e.g.* Authors 2019) – also holds up in a WBL context. Using CFA, we also modelled the covariances between the different latent constructs in each section of the theoretical model (*i.e.* the context, self and engagement section). Where the results of CFA rendered significant covariances between the separate latent constructs, we added covariances between the error terms of these latent constructs in the subsequent SEM model to control the structural relations between the constructs in different sections of the model for covariances between constructs within each section. In order to test the relation between emotional engagement and behavioural disaffection in work-based and school-based learning, we included the latent constructs for the emotional engagement and behavioural disaffection in both the school- and work-based learning contexts in the CFA validating the student engagement constructs. By testing covariances between the different latent constructs measuring student engagement, we were able to explore the relations between emotional engagement and behavioural disaffection across both learning contexts.

**Findings**

***Testing the transferability of the measurement model to a WBL context***

Before reporting on the SEM of the relations hypothesised by the SSMMD, we start by presenting the findings of the CFA testing the measurement models of the latent constructs making up the different sections of the SSMMD

(i.e. context, self and engagement factors). Throughout the following paragraphs we report model fit indices, range and significance levels of the factor loadings and covariances of the latent constructs for each section.

With regard to the context section, we tested a factor model that included a measurement for teacher support as well as the different subconstructs making up the measurement for the learning potential of the workplace (LPW). Nikolova et al. (2014) showed the best model fit for the LPW to be a four-factor model only including the first order constructs support from mentor, support from colleagues, learning through reflection and learning through experimentation. Our data, however, showed the best model fit (CFI=.96; RMSEA=.06) when including a second order factor for both task-based factors of the LPW measurement (i.e. learning through reflection and experimentation). The factor loadings across the first order constructs are significant ($p<.01$) and range from .65 to .93. The covariances between the context factors also showed to be significant ($p<.01$) and range between .11 (between learning through reflection & experimentation and teacher support) and .27 (between learning through reflection & experimentation and mentor support).

In the second CFA, we model four measurements for the self-system factors in WBL, i.e. perceived competence, control, relatedness and autonomous motivation. The results show good model fit (CFI=.95; RMSEA=.07) and significant factor loadings ($p<.01$) ranging from .49 to .87. The covariances amongst all four self-system factors are highly significant ($p<.01$) and range from .13 (between perceived competence and autonomous motivation) and .22 (between perceived relatedness and autonomous motivation).

In a third and final CFA, we tested the engagement section of the SSMMD that consists of the emotional engagement and behavioural disaffection factors, both in a school-based and work-based learning context. The results show good model fit for the engagement and disaffection factors in the school- and the work-based learning context (CFI=.98; RMSEA=.05). The factor loadings are all significant ($p<.01$) and range from .60 to .94. By testing the covariances between the emotional engagement and behavioural disaffection factors in both learning contexts, the model also allowed us to answer the research question on the extent to which emotional engagement and behavioural disaffection in WBL are related to emotional engagement and behavioural disaffection in school-based learning. The CFA showed significant ($p<.01$) covariance between emotional engagement and behavioural disaffection within each learning context (school-based learning: -.09; WBL: -.12), as well as significant ($p<.01$) and positive covariances between emotional engagement and behavioural disaffection across both learning contexts (behavioural: .33; emotional: .08).

Overall, the CFA supported the fact that the latent constructs making up the SSMMD, most of which were previously developed and validated in a school-based learning context (e.g. Authors 2019), can – in an adapted

version – be used for measuring self-system processes and engagement in the context of WBL. Furthermore, the CFA showed that the latent constructs per section are significantly related, which is something we need to account for when building the SEM testing the structural relations across the sections as hypothesised by the SSMMD. The SEM therefore allows for the error terms of the latent constructs within each section to covary.

### *Testing the structural relations hypothesised by the SSMMD in a WBL context*

Building on the structural relations hypothesised by the SSMMD, the SEM tested the following hypotheses within the context of WBL: (a) more support in the WBL context increases the psychological needs satisfaction; (b) higher levels of psychological needs satisfaction relate to higher levels of student emotional engagement and lower levels of behavioural disaffection; (c) a more supportive learning context supports students' emotional engagement and lowers behavioural disaffection in WBL, in part by the indirect effect the learning context has on the self-system processes. In a first SEM, we allowed all of these hypothesised structural relations to be tested. Based on this inferior model we omitted the structural relations that were not significant and/or had a negative impact on the model fit. Figure 2 shows a simplified conceptual model of the significant structural relations kept in the final SEM. We will discuss these significant relations in the next sections.

*** *Figure 2: Final model of the SEM testing SSMMD hypotheses in a WBL context* ***

The model fit indices for the SEM showed a good model fit. We made this assessment on the model fit based on the following indices: normed Chi squared of 1.809, relative fit indexes CFI and IFI values of .94, a Root Mean Square Error of Approximation (RMSEA) of .051 (90 confidence interval: [.046-.056]) and a Standardized Root Mean Square Residual (SRMR) of .0473. The relative fit indexes CFI and IFI nearly meet the stringent .95 cut-off values (Hu and Bentler 1999). Based on the RMSEA of .05 we can infer that the model fits well relative to its degrees of freedom and the SRMR < .05 indicates that the model captures the data well.

Table 2 shows the description of the indicators, standardised regression weights, standard errors and p-values in the measurement model of the SEM. The observed items show all significant ($p<.01$) and moderate to strong standardised regression weights. Table 3 contains the standardised regression weights, standard errors and p-values of the structural relations in the final model of the SEM, as displayed by figure 1.

*** Table 2 and 3 about here ***

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We now report the structural relations of the SEM in three steps. First, we present to what extent the learning context relates to students' self-system processes in WBL. Secondly, we discuss the structural relations between the self-system processes and students' behavioural disaffection and emotional engagement in WBL. Finally, we discuss if and how perceived support in the learning context influences students' engagement and disaffection in WBL, also taking into consideration indirect effects running through the self-system processes. We note that for two structural relations the standardised regression weights exceeded the level of 1 (*i.e.* the second order factor Learning through Learning through reflection and experimentation; and between perceived control and emotional engagement). Although these standardised regression weights could indicate multicollinearity in the model, VIF values from multivariable regression analyses with the same dependent and independent variables using SPSS did not exceed 2.5, which is only half of the VIF cut-off value of 5. Deegan (1978) indicated that scholars should not be reticent to report standardised regression weights outside of the range between [-1, 1] in models.

Although teacher support is, a major antecedent of students' self-system processes in school-based education (e.g. Authors 2019b), our model shows no significant relations between teacher support and self-system processes in WBL. The learning potential of the workplace, both in terms of interactional and task-based learning support does have a significant impact on students' self-system processes in WBL. Feeling supported by the mentor significantly and positively influences students' perceived relatedness to the workplace. The support from colleagues, on the other hand, is positively related to students' autonomous motivation for engaging in WBL. Moreover, learning through reflection and experimentation shows the strongest significant relations to students' self-system processes. Perceiving a workplace as providing good opportunities for learning through reflection and experimentation has a significant positive influence on all measured students' self-system factors in the context of WBL, i.e. students' perceived competence, control, relatedness and autonomous motivation.

As higher levels of psychological needs satisfaction theoretically predict higher levels of students' emotional engagement and lower levels of behavioural disaffection, we also tested these relations in a WBL context. The findings show that having the perception of being in control of performing well, having higher levels of perceived competence and feeling more related to the workplace, positively and significantly predict higher levels of emotional engagement in WBL. Feeling more autonomously motivated in WBL, on the other hand, significantly and negatively relates to behavioural disaffection in WBL.

In a final step, we addressed the effects of the learning context on students' emotional engagement and behavioural disaffection in WBL, incorporating both the direct effects and the indirect effects running through

self-system processes. Although the model showed no significant relations between teacher support and self-system processes in WBL, teacher support significantly decreases students' behavioural disaffection in WBL. Furthermore, support from the mentor directly and significantly increases emotional engagement in WBL. When also taking into consideration the indirect effects running through the self-system processes, the total effect of mentor support on students' emotional engagement showed to be higher ($\beta$ =.208). Although the direct effect of learning through reflection and experimentation on both emotional engagement and behavioural disaffection are not significant, the total effect on emotional engagement – taking into account the indirect effects running through self-system processes – showed to be strikingly strong ($\beta$ =.517).

In sum, many of the hypothesised relations of the SSMMD are confirmed in a WBL context. Our final model, however, does not show all of the hypothesised relations to be significant. As statistically inferior models showed some of the hypothesised relations not to be significant, we omitted these relations when building the final model. What also became clear from exploring the explained variance of both emotional engagement and behavioural disaffection in WBL is that our model explains the variance within students' emotional engagement far better than for students' behavioural disaffection in WBL ($R^2$ =.74 versus $R^2$ = 0.07). Furthermore, when disentangling the explained variance in both emotional engagement and behavioural disaffection by each section of our final model, the self-system section explains the larger part of the variance in both the emotional engagement and the behavioural disaffection factors ($R^2$ = .74 versus $R^2$ = .05). The learning context, however, explains a significant part of the variance in students' perceived control, competence, relatedness and autonomous motivation ($R^2$ =.41; $R^2$ =.38; $R^2$ =.53; $R^2$ =.66; respectively).

**Discussion**

Vocational education and training (VET) – and more particularly work-based learning (WBL) – has been given a prominent role in the European Commission's and many member states' strategies for tackling early leaving from education and training (Cedefop 2016; EU Commission 2015). Given this mounting policy attention for WBL and dual VET pathways in strengthening student engagement in order to reduce number of early leavers, this study aimed to fill a knowledge gap with regard to the relation between WBL and student engagement, particularly within the context of dual pathways combining school- and work-based learning. The literature review indicated an abundance of research on student engagement in (mostly academically) oriented school-based education. Studies specifically focussing on student engagement in work-based or dual VET pathways, however, were limited. Moreover, scholars have situated student engagement in a wider motivational framework, e.g. the Self-

System Model of Motivational Development (SSMMD; Connell and Welborn 1991; Skinner et al. 2008), to theorise its antecedents in students' learning contexts and psychological self-processes. Yet, only few studies tested to what extent the SSMMD premises hold in a WBL context. This study aimed to help fill this void analysing new survey data from a research project evaluating the pilots of a new dual learning system being implemented in Flemish secondary education in Belgium. To this end, we tested the hypotheses proposed by the SSMMD in a work-based learning context and relate student engagement in WBL to their engagement in school-based learning.

Before testing the structural relations hypothesised by the SSMMD in a WBL context, we first validated the latent constructs measuring the elements making up the SSMMD using confirmatory factor analyses. We performed separate CFA by each section of the model – *i.e.* sections consisting of the context, self and engagement factors – and tested for covariances between the latent constructs within each section. The CFA all showed good model fit indices, strong and significant factor loadings and significant covariances within each section. This confirmed that the latent constructs making up the SSMMD in a school-based context (e.g. Authors 2019b) could be transferred to a work-based learning context.

With regard to the hypothesised relationship between student engagement in work- and school-based learning, the CFA for the engagement section also included students' emotional and behavioural engagement factors for school-based learning. The covariances of both engagement factors within each learning context are significant, indicating that emotional engagement reinforces behavioural engagement and vice versa, both within work- and school-based learning. Moreover, the covariances between the emotional and the behavioural engagement factors separately are significant across both learning contexts, showing that emotional/ behavioural engagement in work-based learning relates positively to respectively emotional/ behavioural engagement in school-based learning. The latter finding therefore confirms previous qualitative studies showing that student engagement in work-based learning can support students' engagement in school-based learning, and vice versa (Baartman et al 2018).

With regard to the SEM testing the structural relations hypothesised by the SSMMD, we can conclude that the results showed an overall good model fit for the SSMMD in a WBL context. However, not all hypothesised relations were significant and these were dropped for strengthening the model fit while building our final structural model. This final model primarily explains emotional engagement and only to a lesser extent behavioural disaffection. We would argue that the interpretation of this finding should take into account the limitations of the measurements for behavioural disaffection as well as the exclusively positively formulated predictors (rather than stressors or negative pressures) available in this research (see also Haerens et al. 2015). We elaborate on the limitations of these measurements in the next section below. Nonetheless, the results outlined above showed

emotional engagement and behavioural disaffection in WBL to be mutually dependent, as is the case for student engagement in school-based learning (e.g. Appleton et al. 2008; Fredricks et al. 2004). Our findings also showed that the self-system processes explained the largest part in the variance of both engagement factors in WBL. These self-system factors are, however, themselves largely accounted for by the factors measuring interactional and task-based support in the learning context.

With regard to the hypothesised relation between the learning context and self-system factors in WBL, the findings showed no significant relations between teacher support and students' self-system processes in WBL, which differs from studies testing SSMMD hypotheses in the context of school-based learning (*e.g.* Authors 2019b; Fall and Roberts 2012). The learning potential of the workplace, both in terms of support experienced from the mentor and colleagues as well as the workplace learning opportunities for experimentation and reflection, however, shows significant impact on students' self-system processes in WBL. This further supports the value of the Learning Potential of the Workplace measurement model for establishing the quality of a work-based learning context with regard to supporting learners' basic psychological needs and student engagement, both in terms of task-based as well as interactional support (Nikolova et al. 2014). We reflect on the potential role of the teacher in supporting engagement in work-based learning more elaborately in the final paragraph of this paper.

In terms of the expected relations between self-system factors and student engagement in WBL, higher levels of perceived competence, control and relatedness increases students' emotional engagement. Moreover, feeling autonomously motivated, negatively affects students' behavioural disaffection in WBL.

Finally, the model tested effects of perceived support in the learning context on students' emotional engagement and behavioural disaffection in WBL, also taking into consideration the indirect effects running through self-system processes. While teacher support directly decreases students' behavioural disaffection in WBL, support from the mentor directly increases students' emotional engagement in WBL. Moreover, comparing direct and total effects showed that the initial effects of the learning potential of the workplace on students' emotional engagement in WBL are further strengthened through the self-system processes, which is line with the self-system model of motivational development.

**Limitations and directions for future research**

Before considering implications of our findings for research, policy and practice, we highlight some limitations of this study and present some opportunities for future research. A first limitation concerns the fact that survey data used in this study are self-reported, which makes data more exposed for a social desirability bias. Future research

could strengthen our study's claims by including other data sources such as teacher and mentor assessments of the learning context and student engagement, as well as administrative indicators for behavioural engagement such as attendance and task completion. However, capturing students' self-perceptions and psychological processes using surveys has also the important benefit to measure what is the perception of the students themselves and not what is interpreted through indirect assessment by others. Another limitation is that the testing of the relations hypothesised by the SSMMD is based on cross-sectional data. The relations amongst the context, self-system and engagement factors are, however, theorized as a reciprocal and cyclical process. Nonetheless, previous studies have found strong empirical proof of these processes, at least in a school-based context (*e.g.* Furrer & Skinner 2003; Skinner et al 2008). Longitudinal research can shed more light on the reciprocal workings of the SSMMD in the context of WBL. Furthermore, as the student survey was developed as part of a broader evaluation study on the pilots of the new dual learning system in Flemish VET, the measurements included in the questionnaire had to be limited to core indicators due to time restrictions. Although the confirmatory factor analyses and reliability testing showed compelling results for construct validity and internal item reliability, more elaborated measurements of some theoretical concepts – in particular the measurements for different types of learning support, engagement and disaffection in WBL – could further falsify or deepen the current understanding of our findings. Finally, as the data were collected as part of the evaluation of newly established pilot schools for the new dual learning system in Flemish education, the sample size for this study had to be limited to these pilot schools. While dual learning is currently being introduced in more secondary VET schools, this could provide larger sample sizes and therefore more powerful analyses and generalizable results for future research. This might also nuance a potential selection bias in our sample as the pilots schools might be – in comparison to other schools – more open and positive towards this new dual learning system which might have an effect on the processes we study.

**Implications for research, policy and practice**

In this paper, we provide insights that can support scholars in measuring and further deepening the understanding of learning support, self-system processes and student engagement in the context of WBL. Our analyses show that many tenets of SSMMD in school-based learning also hold true for WBL. While the measurement instruments can be further elaborated on, the validity of several instruments is corroborated by the current study. Furthermore, in line with most theoretical hypotheses, our findings show the relevance of applying the SSMMD to the context of WBL. It shows potential to study work- and school-based learning as two interrelated learning contexts stimulating researchers to further study them in a hybrid manner.

Our findings can also inspire policy makers and practitioners to further invest in and purposefully rethink current dual learning pathways that combine school- and work-based learning in order to strengthen student engagement and to tackle ELET. WBL contexts that provide great learning potential – both in terms of interpersonal and task-based support – help students in satisfying their basic psychological needs and therefore have a positive impact on students' emotional and behavioural engagement in work-based learning. As our findings showed that student engagement is related across both the work-based and school-based learning contexts, we can infer that being engaged in WBL – overall – also positively affects engagement in school-based learning and vice versa. Similar findings about this positive spill-over between work- and school-based learning were already highlighted by previous qualitative research (e.g. Baartman et al 2018) as well as in the broader evaluation research project in which the data used in this study were collected (Authors 2020). WBL experiences are found to make students more easily recognise the importance of the content learned in the school context. Students also indicated to learn differently in school due to more practical learning experiences in the workplace. An important condition for this positive spill over to occur is the support from teachers and workplace mentors in connecting learning experiences in both contexts and putting forward clear learning goals (Authors 2020). Under these conditions, investing in dual pathways that combine school- and work-based learning can strengthen student engagement. This could prevent, or intervene in, decreasing student engagement or disaffection processes, potentially leading to early school leaving and loss of necessary learning experiences and qualifications.

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