The role of self- and social directed goals in a problem-based, collaborative learning context

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Abstract Students' learning goals demonstrate much stronger variety than traditional goal orientation models for classroom learning assume, especially when the educational context allows so. In this empirical study we will investigate the richness of students' goal orientation in a collaborative learning context. We do so with the help of a goal setting framework that is based on a two-facet approach distinguishing multiple contents (performance, learning, well-being) and goal directions (varying degrees of self vs social direction). To investigate the role of different goal constellations, goal setting and learning performance data of first year students (n = 2,636) in a problem-based, collaborative learning program, and evaluation data of problem-based tutorial groups (#groups = 206) are combined into a multilevel model. Each tutorial group functions in two different educational settings: one directed at open-ended, group problems, the other at closed, individual problems. Educational context appears indeed to have a crucial role in the relationship between students' goal setting at the one side, and students' performance and group functioning on the other side.

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Introduction

Personal goals as a source of—and directive function for—an individual's actions has been a central concept in research on motivation in learning contexts for several decades. In more recent empirical work, however, goals have been operationalized in more specific, situational, and holistical ways (Boekaerts 2002; Boekaerts, de Koning, and Vedder 2006; Dweck and Elliott 1983; Elliot 1999; Ford 1992; Ford and Nichols 1991; Pintrich 2000a, b; Pintrich and Garcia 1991). In light of these developments, it is startling to note that existing research into personal content goals has given limited attention to the evolution of the learning environments in which these goals arise. To date, most empirical research has examined personal content goals in environments that are implicitly designed for students' solo learning, either on their own or within a classroom setting. Research into the personal content goals which emerge in group learning activities remains greatly limited.

Early research related to goals in collaborative learning activities was framed in a goal achievement orientation perspective, primarily centred on the influence of group goals on individual achievement. For example, a 1979 study by Johnson, Johnson and Tauer demonstrated that groups with a cooperative, interpersonal goal structure performed better than students in groups with a competitive or individualistic goal structure. In a study by Ortiz, Johnson, and Johnson (1996), students working on a small group activity in which individual success was contingent on the success of the group, and in which the group members were required to share essential materials, outperformed students whose small group activity was designed to foster an individualistic goal structure.

More recent research has attempted to relate achievement goal orientation to various measures of the learning process. For example, Linnenbrink and Hruda (Linnenbrink 2005; Linnenbrink and Hruda 1999) found that individual and group goals can predict students'

engagement in metacognitive self-regulation, as well as their perceived quality of group interaction. Every aforementioned study, however, predominantly focused on achievement goal orientation. Yet as stressed by Boekaerts and colleagues (e.g. Boekaerts 2002; Boekaerts, de Koning, and Vedder 2006; Hijzen, Boekaerts, and Vedder 2007) and others (Downson and McInerney 2003; Ford 1992; Lemos 1999; Wentzel 1994, 1996), achievement goals represent only a portion of a student's most meaningful personal content goals. This is especially pertinent with regard to group learning activities, where the social environment may generate additional or revised objectives. For example, Hijzen, Boekaerts and Vedder (2006, 2007) have highlighted a strong relationship between social support goals and the quality of a group learning activity. Their studies revealed that mastery and social responsibility goals were prevalent in effective teams, while learning for a certificate and entertainment goals emerged in ineffective teams. Wosnitza and Volet (2009a, b) describe a number of personal content goals spontaneously expressed by students in a group learning activity that reflected the social nature of their environment. For example, being personal or collective well-being within the group, the intention to assist other students, and determination to contribute to the development of a positive group atmosphere. Their research also revealed that students' personal content goals in a group learning activity were strongly linked to their prior experience and, most importantly, that different goal-profiles were generated for different group work settings. And recent research by Wentzel, Baker, & Russel (2012) indicates that women have stronger social goal orientations than men in collaborative learning situations.

In summary, it can be said that throughout the learning process students tend to pursue multiple significant goals that extend beyond purely academic endeavours. Moreover, collaborative learning carries goal-striving beyond an exclusively individual direction by providing a meaningful social dimension: peers who participate in a collaborative learning environment are naturally included in the pursuit of a collective goal (Järvelä, Volet, and

Järvenoja 2010; Nolen and Ward 2008; Volet, Vauras and Salonen 2009). This assumption forms the basis of the framework for personal content goals in collaborative learning contexts developed by Wosnitza and Volet (2009a, b), on which this study is based.

A framework for personal content goals in collaborative learning contexts

Wosnitza and Volet's (2009a, 2009b) framework is grounded in two major theoretical traditions related to immediate goals in learning and motivation (Anderman 1999) (see Figure 1). Firstly, it builds upon the multiple goal approach that distinguishes between performance and mastery/learning goals and between an approach and an avoidance dimension (Elliott 1999; Pintrich 2000a). It also incorporates recent inquiries into multiple, more holistic goals, such as the work of Boekaerts (2002), who argues that academic goals can only be properly understood through consideration of their interaction with socio-emotional goals. This perspective covers the range of personal, academic and non-academic goals (e.g. social, well-being) that individuals pursue concurrently and dynamically in real-life learning situations (Boekaerts 2002; Boekaerts, de Koning, and Vedder 2006; Ford and Nichols 1991; Harackiewicz et al. 2002; Harackiewicz and Linnenbrick 2005; Roeser 2004; Wentzel 1991).

The second key characteristic of personal content goals in social learning contexts in Wosnitza and Volet's framework is direction, which is the extent to which a goal is either self-directed or directed toward the social learning environment. In other words, goals can be directed toward outcomes for one's own benefit (self-directed), toward others, or for the benefit of the group as a whole (socially directed). Previous literature has focused disproportionately on those goals with a self-direction; goals with a social direction have received comparatively little attention.

Researchers such as Boekaerts (2002), Dowson and McInerney (2003), and Lemos (1999) have explored the notion that social goals comprise a separate category of personal content goals that cover a broad range of an individual's social endeavours. These might include making new friends, enjoying each other's company, developing a social network, or better serving one's wider community. Drawing on Anderman's (1999) case for the interaction between social goals and academic goals, Wosnitza and Volet (2009a, b) have conceptualised goals in terms of the interaction between the desired outcome (i.e., performance, learning, or well-being) and the direction (self, social). Their framework is based, therefore, on the assumption that in a collaborative learning context any personal content goal is located within a social setting and thus cannot be considered without the social nature of its environment.

| Directions of goals | Role of self & others | Multiple goals | | |
		Performance	Learning	Well-being
Self-Direction	Self dominant	A	B	C
	Self using others for own benefits	D	E	F
Social Direction	Others benefiting from self	G	H	I
	Others & self confounded	J	K	L

Fig. 1 Framework for personal content goals in collaborative learning contexts (Wosnitza & Volet, 2009a, p. 53)

The three columns of the matrix represent the concept of multiple goals. Each column corresponds to one of three broad types of personal content goals that a student may display before and during a social learning activity: performance, learning and well-being. The four rows represent the directionality of personal content goals. The top two rows correspond to

goals that are predominantly self-directed; the bottom two rows indicate goals with a predominantly social direction.

The first row represents the performance, learning and well-being goals that are mainly self-directed (though the social environment is always present). To date, research has primarily focused on this first row, i.e., self-directed goals (e.g. Ames 1992; Elliot 1999; Ford and Nichols 1991; Wentzel 1991). In contrast, Wosnitza and Volet's conceptual framework on learning in a collaborative context includes three additional categories of goal direction, ordered by increasing social orientation. The goals represented in the second row are focused on using others for personal gain. In this sense these goals are predominantly self-directed, but differ from the first row goals in their dimension of social instrumentality to achieve the desired, self-directed outcome.

The bottom two rows represent goals with a further social direction. The third row comprises the pursuit of goals that benefit others. These goals have a dominant social direction, in contrast to the second row goals. Altruistic-type goals are often not mentioned in literature (Anderman 1999), although some students have reported motivation to take personal responsibility and a pro-social orientation in collaborative learning activities (e.g. Volet and Mansfield 2006).

The fourth row represents personal content goals directed towards benefiting the group as a whole, with the self and others treated as a single social entity. Shared goals have received little attention in the educational psychology literature on goals, but have emerged as a focus of recent work on collaborative learning and the self-regulation of learning (Järvelä et al. 2003; Vauras et al. 2003).

The simultaneous consideration of multiple goals (i.e., whether goals are focused on achievement, learning, or well-being) and the directions of goals (i.e., the extent to which goals have a self- versus social direction) yields twelve distinct categories. This framework

led to the design of an empirical study aimed at better understanding the nature and significance of multiple goals in collaborative learning situations. More specifically, the study aimed to determine how personal goals play out in collaborative learning activities, and how their role differs across activities that vary in emphasis on collaborative and individual learning outcomes. Three research questions were developed:

- What is the empirical support for distinguishing between two characteristics of personal content goals, i.e. multiple goals and direction of goals, and how psychometrically robust are the goal scales representing each cell of the framework?

- What roles do multiple goals—and goals containing a social dimension—play in collaborative learning situations and what is the role of gender?

- How do these roles differ across learning situations that display varying levels of collaborative and individual learning?

The above three questions will be investigated through surveying first year university students in a collaborative learning environment within a program designed according to problem-based learning principles.

Methodology

Participants and educational context

This study involves three cohorts of first year students of the Business and Economics School of Maastricht University (academic years 07/08, 08/09 and 09/10) in the Netherlands. This school's program deviates from a conventional European university education in two important ways: it employs a student-centred learning approach called "problem-based

learning" (PBL), and it has a strong international orientation. Of the 2636 students on which this study is based, 71.5% have an international background (mostly European, with somewhat more than 50% originating from German speaking countries); the remaining 28.5% are Dutch students. 63.3% of the students are male, 36.7% female.

The main principles of PBL — collaborative learning in small groups of students, learning steered by open-ended problems—are well documented within the context of business and economics education (e.g. Wilkerson and Gijselaers 1996). The students come from 206 tutorial groups whose size ranges from 12 to 14 students. In PBL, students are randomly assigned to tutorial groups. As a consequence, the group composition will be more heterogeneous than when self-selection of groups is allowed (Wosnitza & Volet, 2012). Collaborative learning finishes with individual assessment: individual performances are evaluated by written exams, or assessments of individual assignments. These comprise the main assessment instruments, with only minor weight for assessed group work or an individual's contribution to the collaborative learning process.

The open-ended problems of a problem-based program are organized into large units called educational blocks, which cover a much broader range of academic subjects than in traditional university courses; the intention being to allow the problems to be integrated. For that reason, students entering the first year of the programs business and economics will study their first half-semester in only two of those blocks, each having a 50% study load: one on Management of Organizations and Marketing (MOM), main topics from the social sciences, and the other on Quantitative Methods. Both blocks are based on group learning, and employ exactly the same group division, but MOM fully incorporates the problem-based learning principles of collaborative learning steered by open-ended problems, whereas QM applies an approach more centred on individual learning and closed problems. Thus the students in the 206 tutorial groups experience and evaluate two different learning systems directed at different topics and

coached by a different tutor, but with the same composition, and the same students in the tutorial group.

Procedures

Evaluations of the educational process for both contexts are collected at the end of the eight week blocks. Individual evaluation data is made anonymous and then aggregated on a tutorial group level, making evaluation data available on tutorial group level for 206 collaborative learning groups for two different contexts. The second data component, the personal content goals in collaborative learning contexts, was measured in the third week of education, after students have been trained in the principles of problem-based learning, but before tutorial group functioning has had the chance to (fully) crystalize. This timing ensures that the goal measurement is primarily a characteristic of the student, rather than allowing it to be socially constructed. This timing aspect is important in light of a recent debate over whether learning motivations are socially influenced by their context, or socially constructed through interactions with their context (Järvelä, Volet, and Järvenoja 2010; Nolen and Ward 2008). Such an interaction, if present, cannot be made visible in this study, since group functioning is only measured as part of the evaluation of the educational process many weeks later. So, although a bidirectional relationship between motivational profiles of students and functioning of collaborative learning groups provides the most general framework, timing issues in the research design imply that we can observe only the way that students' goal profiles influence the group learning process.

Instruments

Personal content goals in collaborative learning contexts were measured with a newly-developed instrument based on the framework for content goals discussed above (Wosnitza & Volet, 2009a, b). As described earlier, this framework suggests that goals are multiple and consist of performance, learning and well-being goals. Moreover, these goals must be distinguished in regard to their directionality, ranging from primarily self-directed to primarily social directed. Self-dominant and Self using others for own benefits lie in the dominant self-direction category, whereas Others benefiting from self and Others & self confounded have a dominant social direction (see Figure 1). In the instruments, each goal constellation is covered by four to six items.

All 76 items ask the student to indicate the personal priority of the goal constellation making use of the 1 … 7 Likert scale. Each item begins with the same stem: 'My goal is it …'. The 7-point Likert scale allows for three anchors: not true of me at all / definitely no priority (1), completely true of me / highest priority (7), and the middle anchor: don't know / neutral (4). Samples of items for all goal constellations have been included in Table 2 of the next section.

The assessment of the educational process makes use of an internal evaluation instrument that is used in all areas of the university. The instrument distinguishes, among other aspects, the following scales:

- Content expertise of tutor: one item on 1 … 5 Likert scale ('The tutor sufficiently mastered the course content.');

- Involvement of tutor: four items on 1 … 5 Likert scale (sample item: 'The tutor encouraged all students to participate in the (tutorial) group discussions.');

- Grade tutor: one item expressed as school grade (Evaluate the overall functioning of your tutor in this course with a grade: (1 = very bad, 6 = sufficient, 10 = very good).);

- Tutorial group functioning: two items on 1 … 5 Likert scale (sample item: 'Working

   in tutorial groups with my fellow-students helped me to better understand the subject

   matter of this course.').

Although the responsibilities of the tutors guiding the collaborative learning extend those

relevant in the individual learning situation, one uniform evaluation instrument is used in all

courses of the program. Its first three scales concern the tutor's role in facilitating the group

learning process. These demonstrated a very strong correlation (tutor grade correlates 0.91

with tutor expertise and 0.93 with tutor involvement in the quantitative methods block; and

correlates 0.85 with tutor expertise and 0.91 with tutor involvement in the management and

marketing block). For that reason, in this study the focus is on two effect variables from the

evaluation data measuring students' appreciation of the learning process: the tutor grade, as an

indicator of the tutor's facilitation of learning, and tutorial group functioning. These two effect

variables are measured twice for each tutorial group (in the blocks MOM and QM).

Data analyses and goodness of fit

Data in this study is assembled both at the individual level, where it regards the characteristics

of students, and at the group level, where it regards the characteristics of tutorial groups. For

this reason, a multilevel model approach was chosen. The methodological literature

differentiates two types of multilevel models: macro-micro and micro-macro (Croon and

Veldhoven 2007; Snijders and Bosker 1999). In macro-micro models, a dependent variable

measured at the individual level is assumed to be influenced by an explanatory variable

measured at the group level (and, possibly, by other variables measured at the individual

level). The direction of causality, then, is assumed to go from the group level to the individual

level. The vast majority of multilevel modelling statistical techniques, and that of

applications, is of this type (Snijders and Bosker 1999). In the educational domain, one can imagine student achievements being influenced by class, school or even school district characteristics. In contrast, in micro-macro multilevel models causality is assumed to go from the individual to the group level. Examples are situations such as sales teams or collaborative learning teams, where the group performance depends on favourable characteristics of individual group members. Classical approaches to cope with this type of multilevel data are either aggregating or disaggregating the data (Croon and Veldhoven 2007). In the aggregation approach, a variable measured at the individual level is transformed into a group level variable by averaging over all group members. In the disaggregation approach, individuals are assigned the group score as their score on a group-level variable. Our application employs a micro-macro model without group level characteristics in the explanation of the outcome variable, creating a multilevel model with all explanatory variables at individual level and the dependent variable at group level. For this reason, no interaction between the different levels in the production of the outcome variable can exist, and a classical aggregation approach is appropriate.

The statistical analysis followed a two-step approach, where in the first step a confirmatory factor model is estimated at the individual level in order to produce an adequate set of latent factor scores of multiple goals that, after aggregation, serve as explanatory variables in group level regressions. Students' responses to items in the multiple goal instrument have been regarded as indicators of latent constructs, representing each of the 12 goal constellations. To allow for a reduced dimension of independent goal constellations in our educational context, second-order confirmatory factor modelling was applied, where second-order factors mirror the assumptions of similarity of specific goal constellations given the characteristics of the educational context, thus creating more parsimonious models.

Gender effects in structural equation models have been investigated through a sequence of invariance tests (Byrne 1998), directed at gender effects in levels, and gender effects in both levels and the structural model. Before investigating gender effects in the structural equation context, the presence of gender effects in levels is analyzed with independent samples *t*-tests. From those tests, percentage differences, *t*-values, and *d*-values or Cohen effect-sizes will be reported. *D*-values larger or equal to 0.8, 0.5, and 0.2, respectively, correspond to differences being large, medium, and small in size (Cohen 1988).

Results

Instrument validation

Table 1 contains descriptive statistics of the scales of the instrument social directed personal content goals, together with a sample item of each goal constellation. Cronbach's alpha reliabilities of all scales appear satisfactory, with the sole exception of a weaker reliability in the self-directed performance goal (A). Stability of the instrument was tested by comparing mean scores in the three consequent cohorts. Outcomes were robust: no differences were found between any cohorts on any of the scales. To demonstrate another perspective of natural variation in scores, Table 1 and Figure 2 provide patterns of gender variation in the scale means, based on 961 female and 1655 male responses.

Table 1 Statistics of the twelve scales of the Social directed personal content goals instrument

Scale	Sample item: My goal is it, …	Reliability no. items	Mean scores	Gender difference
A: self-directed performance goal	… to get the highest mark possible.	$\alpha = 0.60$ n = 6	Females: 5.69 Males: 5.55	$t = 5.02$ $d = 0.20$
B: self-directed learning goal	… that I acquire as much new knowledge as possible.	$\alpha = 0.75$ n = 5	Females: 6.11 Males: 5.88	$t = 8.47$ $d = 0.34$
C: self-directed well-being goal	… to enjoy the group-work experience.	$\alpha = 0.78$ n = 6	Females: 5.92 Males: 5.69	$t = 7.68$ $d = 0.31$
D: self using others performance goal	… to achieve a good grade much more easily because of the group.	$\alpha = 0.74$ n = 6	Females: 4.09 Males: 4.14	$t = -1.30$ $d = -0.05$
E: self using others learning goal	… to learn something new from my group members' knowledge and ideas.	$\alpha = 0.70$ n = 5	Females: 5.54 Males: 5.28	$t = 8.44$ $d = 0.34$
F: self using others well-being goal	… to feel accepted by the group.	$\alpha = 0.75$ n = 5	Females: 5.72 Males: 5.37	$t = 11.03$ $d = 0.45$
G: others benefiting self performance goal	… to do my best to help the group get a good mark.	$\alpha = 0.81$ n = 5	Females: 5.59 Males: 5.39	$t = 6.29$ $d = 0.26$
H: others benefiting self learning goal	… to make a major contribution to others' understanding	$\alpha = 0.80$ n = 5	Females: 5.47 Males: 5.25	$t = 6.88$ $d = 0.28$
I: others benefiting self well-being goal	… to take personal responsibility for creating a good group learning atmosphere	$\alpha = 0.85$ n = 6	Females: 5.68 Males: 5.41	$t = 9.04$ $d = 0.37$
J: others & self shared performance goal	… that together we achieve the highest mark possible.	$\alpha = 0.78$ n = 6	Females: 5.95 Males: 5.68	$t = 10.01$ $d = 0.41$
K: others & self shared learning goal	… that everyone in the group learns a lot from the others.	$\alpha = 0.86$ n = 4	Females: 6.07 Males: 5.65	$t = 13.68$ $d = 0.55$
L: others & self shared well-being goal	… that all group members get along well with each other.	$\alpha = 0.82$ n = 5	Females: 6.13 Males: 5.73	$t = 14.01$ $d = 0.57$

Note: With current sample sizes, t-values larger than 1.96 are significant at 5%, larger than 2.58 are significant at 1%, larger than 3.30 are significant at 0.1% significance level.
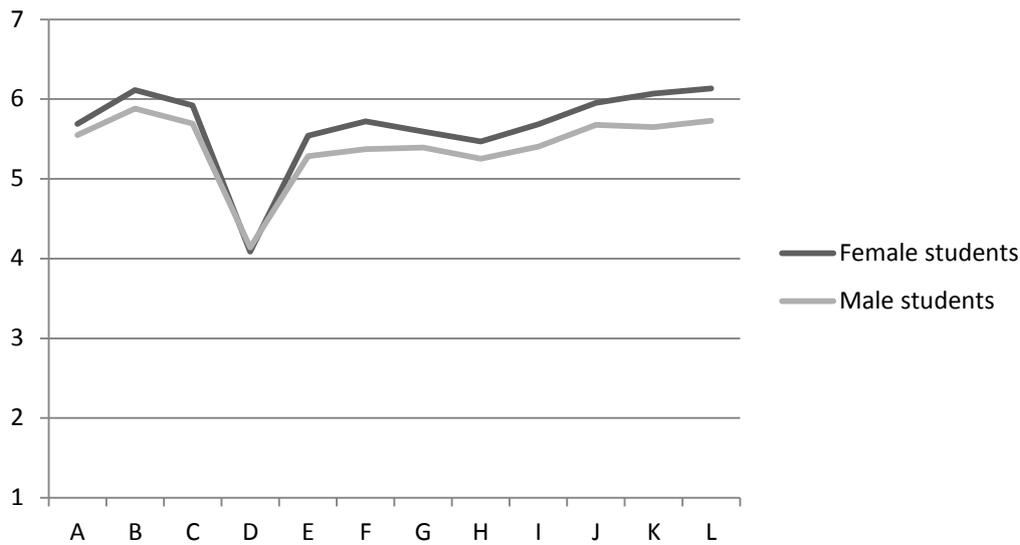
Fig. 2 Scale means for female and male students

As in Wosnitza and Volet (2009a), mean scores exceed the midpoint of the Likert scale, and with exception of the Self using others performance goal scale D, 95% confidence intervals of scale means exceed the level of 5.3. Again with the exception of category D, gender differences are always in the direction that female students achieve higher goal scores than male students. Effect sizes (as indicated by Cohen d-values) range from small to medium, with the largest differences occurring for well-being goals (C, F, I, L) and goals with the strongest socially shared dimension: J, K, L. In goals that satisfy both types, the well-being directed goals of cell L with social sharing that strong that Others and Self are confounded, the d-value equals 0.57: female students score 7% higher than male students. These outcomes are in line with those in Wentzel et al. (2012), that also favour female students, with larger effects for social goals than for learning and performance goals.

Correlations amongst all scales are positive and range from r = .12 (goals D & K) to r = .85 (goals G & H). Especially the six goal constellations with a dominant social direction, G – L, share high correlations: nowhere lower than r = .64. This outcome was expected, and is a

consequence of the particular educational environment governing the application. We make use of the peculiarities of the context to derive an appropriate second-order structure.

Contextual model validation

Wosnitza and Volet (2009a) discussed the idea that different educational contexts may cause specific goal constellations to cluster. They showed that in formal academic collaborative learning settings in which students are assessed as groups, three clusters of goal constellations become relevant: performance goals, which combines self- and socially focused performance goals (A, D, G, and J); learning and well-being goals with a self-direction (B, C, E, and F); and learning and well-being goals with a social direction (H, I, K, and L). In our application, self-directed goals were of even greater importance, since collaborative learning was combined with individual assessment. Based on these considerations, it was opted to have performance and learning goals on the level of self using others for own benefits as primary and separate goal constellations (D and E). Next, it was hypothesised that all goal constellations with a dominant social direction (G, … , L) would form one cluster. The remaining four constellations (A, B, C, and F) were grouped into two clusters: two well-being related constellations (C & F), and two purely individual achievement orientations (A & B).

To validate this, the next step involved identifying parsimonious individual level models of multiple goal constellations. As a base-model, a first-order confirmatory factor model was estimated, using the 12 goal constellations as latent factors, and the 76 item scores as observed indicators of the factors. Fit indices of this base-model are contained in Table 2, under the label One-group 1st order CFA. Latent factor correlations are substantial, suggesting the existence of more parsimonious model structures. Next, a second-order model is estimated, containing as second-order factors the three clusters of goal constellations

hypothesised in the specific educational context: performance and learning goals with a self-dominant direction (SelfDominant); self-directed well-being goals (WellBeing), and goals with a social direction (SocialDirected). Fit indices of this model are contained in Table 2 under the label One-group 2nd order CFA.

Table 2 Fit Indices of Confirmatory Factor Models and Structural Equation Model

	χ^2	*df*	RMSEA	SRMR	GFI	NNFI	CFI	RFI
One-group 1st order CFA	22686	1886	.074	.087	.75	.96	.97	.96
One-group 2nd order CFA	16558	1912	.060	.094	.81	.98	.98	.97
Two-groups 2nd order CFA	19907	3983	.061	.110	.74	.97	.97	.97
Structural Equation Model	16670	2041	.060	.092	.80	.97	.98	.97

Table 2 indicates the second-order model to be more parsimonious than the first-order model, while achieving better fit. Fit indices of both models range between good (NNFI, CFI, RFI) via reasonable (RMSEA, SRMR) to weaker (GFI). Modification indices suggest allowing cross-loadings to improve fit, but for purposes of parsimony and model purity, no model improvements were applied. A similar remark refers to the dimensionality of the goals clusters: given the clear interpretation of 5-cluster solution A & B, D, E, C & F, and G – L, no attempt was made to reduce the number of clusters. The central position of goal constellations in Cluster E, representing Learning goals with a non-dominant self-direction, was modelled by allowing paths from all three second-order factors to first-order factor E. Therefore, the factor loadings of first-order factors on second-order factor, has the structure depicted by Table 3.

Table 3 Standardized estimates of first order factor loadings on second order factors and gender effects in second order factors

	A	B	C	D	E	F	G	H	I	J	K	L	GenderDiff
SelfDominant (A & B)	.97	.99			.17								*t*=10.42 d=0.42
WellBeing (C & F)			.96		.18	.99							*t*=12.22 d=0.50
SocialDirected (G – L)					.61		.92	.90	.92	.97	.99	.96	*t*=13.66 d=0.55

Gender effects are present both in latent means and model structure, with the first type being dominant. All latent means except D demonstrate significant gender differences, with female goal setting achieving higher levels than male goal setting. (See Table 1 for the gender effects.) This pattern is repeated in gender effects in second-order latent factors: all three factors demonstrate significant differences, of medium size, in favour of female students: see the last column of Table 3. Gender effects in model structure are restricted to nine error variance terms in first-order factors measurement equations. Gender differences are always in the same direction: female students not only score higher, but also demonstrate less diversity, leading to smaller error variances (especially in the G – L cluster).

The last modelling step for individual data is the estimation of a structural model to explain course performance out of the five motivation clusters. Table 4 contains the standardized path coefficients that are significant at the .05 level. Only three paths are significant and produce a prediction equation for performance in the collaborative learning based MOM course without any predictive potential (R^2=3%), but one in the individual learning based QM course with a substantial contribution in explained variation (R^2=44%). In both prediction equations, the cluster of SelfDominant goals (A & B) is the strongest predictor, its size being only substantial in explaining QM performance. The cluster SocialDirected goals is insignificant in explaining performance in collaborative learning, but weakly significant in explaining performance in individual learning, with a negative coefficient.

Table 4 Standardized path coefficients, significance level and explained variation of structural equations

	SelfDominant			WellBeing	SocialDirected	R^2
	A & B	D	E	C & F	G - L	
MOM_performance	.17 (<.001)					3%
QM1_performance	.85 (<.001)				-.30 (<.05)	44%

Modelling the group level

On the group level, it is our aim to predict the functioning of the group, measured by the grade of students' assessment of the functioning of the group (TutorialGroupMeanGrade) and students' assessment of the contribution of the tutor to group functioning (TutorMeanGrade), on the basis of the same but aggregated predictor variables as used in the individual level models. Explanatory variables are again scores for the five goal clusters A & B, C & F, D, E, and G – L, measured as mean score for the tutorial group. Table 5 contains estimated beta's of prediction models for tutorial group and tutor functioning for the collaborative learning course MOM, Table 6 contains the same beta's for the individual learning course QM.

Table 5 Regression beta's, significance and explained variation of regression equations for MOM

	TutorialGroupMeanGrade		TutorMeanGrade	
	Beta	Significance	Beta	Significance
A & B_TutorGroup_Mean	-.125	.321	.001	.992
D_TutorGroup_Mean	-.107	.150	-.036	.633
E_TutorGroup_Mean	.053	.648	.060	.614
C & F_TutorGroup_Mean	-.302	.047	-.369	.018
G - L_TutorGroup_Mean	.632	.001	.489	.012
R^2	11.4%		7.0%	

Table 6 Regression beta's, significance and explained variation of regression equations for QM

	TutorialGroupMeanGrade		TutorMeanGrade	
	Beta	Significance	Beta	Significance
A & B_TutorGroup_Mean	-.238	.070	-.046	.730
D_TutorGroup_Mean	.002	.981	.020	.795
E_TutorGroup_Mean	-.019	.872	.071	.560
C & F_TutorGroup_Mean	.272	.085	.120	.449
G - L_TutorGroup_Mean	.068	.729	-.250	.205
R^2	4.0%		2.4%	

Table 6 is easiest to interpret: no relation exists between goal clusters, aggregated to group level and group or tutor functioning. All paths appear insignificant at .05 level. Table 5,

summarising the models for the collaborative learning part, depicts another pattern: at least two of the goal clusters have an impact on group and tutor functioning. The strongest impact is from the SocialDirected goal cluster G − L: in groups where students' average level of socially directed tendencies is high, groups function better, and tutors have a better contribution to group functioning. The second impact by the WellBeing goal cluster C & F is negative: groups in which students focus strongly on well-being goals on the individual level function worse than other groups, and tutors demonstrate a lower contribution to group functioning.

Discussion

This study addresses the lack of research on the significance of personal content goals in collaborative learning contexts—specifically, research that takes into account the social dimension of such settings. The empirical study was designed to examine the roles of multiple goals and goals containing a social dimension within collaborative learning situations, and how these roles differ across learning contexts that vary in their emphasis on both collaborative and individual learning outcomes.

The first research question examined the empirical support for Wosnitza and Volet's (2009a, b) conceptual distinction between two dimensions of personal goals in collaborative learning contexts: multiple goals and direction of goals. Our findings provide support for Wosnitza and Volet's framework for personal content goals in collaborative learning. The two dimensions were found useful for capturing the complex, multi-dimensional nature of students' personal content goals in collaborative learning. Furthermore, the framework was found to be flexible enough to accommodate the specific circumstances of group learning situations, and led to meaningful findings based on the existing dimensions of the framework.

Future research will need to further establish the ways in which different learning and assessment settings can foster different goal configurations.

The second question addressed the functions of multiple goals and goals containing a social dimension in collaborative learning situations. Data in this study is pairwise from 206 tutorial groups. Each tutorial group, with the same student composition but guided by a different tutor, followed two courses: one focusing on individual learning while still employing collaborative learning tools, one following problem-based learning principles of collaborative learning. These differences in instructional focus were found to have a crucial impact on whether social-directed goal setting assists group functioning. With a focus on individual learning, group goal setting characteristics do not seem to play a role in group functioning. If, however, the same group composition is applied using typical open-ended group problems of problem-based learning, group goal setting characteristics do matter: groups composed of students high on socially directed goals outperform other groups (and groups high on well-being goals underperform other groups). The ability to compare the functioning of a single group in two different settings also provides insight into the interpretation of the relationship: it excludes the option that socially directed students simply *assess* their group functioning more positively, without that group functioning genuinely differed from other groups. With only systematic differences in perception, an explanation why these socially directed students did not assess the functioning of the same group at equal levels in both courses would not have been feasible. Therefore it is the functioning of the groups itself that matters, indicating that, depending on the instructional context, social goals of students indeed make a difference.

Goal setting behaviour relevant for explaining individual student performance is different from goal setting explaining group functioning. A crucial aspect of this difference is the type of assessment: in both settings student assessment is individual. As a consequence, self-

directed goal orientations rather than social-directed goal orientations predict students' performance. Moreover, it is the math-based setting of individual learning goals, rather than the social sciences-based setting of group learning goals, that demonstrates a substantial relationship between goal setting and performance. The relationship found between students' performance and their self-dominant performance and learning goal setting may in part be caused by the special position of the QM course: a difficult and demanding service course, requiring high levels of individual motivation. At the same time, our study demonstrates that any educational environment should be firmly rooted in collaborative contexts with strong focus on group learning to allow for social-directed goal setting.

The significance of shared goals in collaborative learning has gained momentum in recent research (Häkkinen and Järvelä 2006; Vauras et al. 2003). The present study provides further empirical support for this position, and extends it by stressing its multi-dimensional benefits. Goal settings that appear to be supportive for group functioning in one setting become less relevant when making small changes in the balance between collaborative and individual learning. Given the short time horizon, this study does not allow to investigate the other component of the reciprocal relationship between multiple goals and group functioning: how group functioning would feed-back into revising levels of multiple goals. The lesson we derive from it is that striving for a multiple goal constellation that best adapts to and facilitates the chosen learning context is really a matter of fine-tuning the learning outcomes, task structures and formative and summative (group) assessments. Preliminary findings by Rienties, Alcott and Jindal-Snape (submitted) indicate that when students work on authentic and complex group tasks for a sustained period of time, goal orientations and actual social learning links in groups become more socially oriented over time.

References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, *84*, 261–271.

Anderman, L.H. (1999). Expanding the discussion of social perceptions and academic outcomes: Mechanisms and contextual influences. In M.L. Maehr & P.R. Pintrich (Series Eds.) and T. Urdan (Vol. Ed.), *Advances in motivation and achievement: Vol. 11. The role of context* (pp. 303–336). Stamford, CT: JAI Press.

Boekaerts, M. (2002). Bringing about change in the classroom: Strength and weaknesses of the self-regulated learning approach – EARLI Presidential Address, 2001. *Learning and Instruction*, *12*, 589-604.

Boekaerts, M., E. de Koning, & P. Vedder (2006). Goal-Directed Behavior and Contextual Factors in the Classroom: An Innovative Approach to the Study of Multiple Goals. *Educational Psychologist*, *41*, 33-51.

Byrne, B.M. (1998). *Structural equation modeling with LISREL, PRELIS, and SIMPLIS: basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum.

Cohen, J. (1998). *Statistical power for the behavioral sciences* 2nd ed. Hillsdale, NJ: Erlbaum.

Croon, M.A., & M.J.P.M. van Veldhoven (2007). Predicting group-level outcome variables from variables measured at the individual level: A latent variable multilevel model. *Psychological Methods*, *12*, 45-57.

Dowson, M., & D.M. McInerney (2003). What do students say about their motivational goals? Towards a more complex and dynamic perspective on student motivation. *Contemporary Educational Psychology*, *28*, 91-113.

Dweck, C.S., E.S. Elliot (1983). Achievement motivation. In. E.M. Hetherington (Ed.), *Handbook of Child Psychology. Vol. 4: Socialization, Personality, and Social Development*, pp. 643–91. New York: Wiley

Elliot, A.J. (1999). Approach and Avoidance Motivation and Achievement Goals. *Educational Psychologist*, *34*, 169-189.

Ford, M.E. (1992). *Motivation humans: Goals emotions, and personal agency beliefs*. London: Newbury: Sage Publications.

Ford, M.E. & C.W. Nichols (1991). Using goal assessment to identify motivational patterns und facilitate behavioural regulation and achievement. In M. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement: Vol. 7. Goals and self-regulatory processes* (pp. 61-84). Greenwich, CT: JAI Press.

Häkkinen, P. & S. Järvelä (2006). Sharing and constructing perspectives in web-based conferencing. *Computers & Education*, *47*, 433-447.

Harackiewicz, J.M., K.E. Barron, P.R. Pintrich, A.J. Elliot, & T.M. Thrash (2002). Predicting Success in College: A Longitudinal Study of Achievement Goals and Ability Measures as Predictors and Performance From Freshman Year Through Graduation. *Journal of Educational Psychology*, *94*, 562-575.

Harackiewicz, J.M. & E.A. Linnenbrink, (2005). Multiple Achievement Goals and Multiple Pathways for Learning: The Agenda and Impact of Paul R. Pintrich. *Educational Psychologist*, *40*, 75-84.

Hijzen, D., M. Boekaerts, & P. Vedder (2006). The relationship between the quality of cooperative learning, students' goal preferences, and perceptions of contextual factors in the classroom. *Scandinavian Journal of Psychology*, *47*, 9-21.

Hijzen, D., M. Boekaerts, & P. Vedder (2007). Exploring the links between students' engagement in cooperative learning, their goal preferences, and appraisals of instructional conditions in the classroom. *Learning and Instruction*, *17*, 673-687.

Järvelä, S., P. Häkkinen, M. Arvaja, & P. Leinonen, (2003). Instructional support in CSCL. In P. Kirchner, J-W. Strijbos & R. Martens (Eds.), *What we know about CSCL in higher education* (pp. 115-139). New York: Kluwer Academic Publishers.

Järvelä, S., S. Volet, & H. Järvenoja (2010). Research on Motivation in Collaborative Learning: Moving Beyond the Cognitive–Situative Divide and Combining Individual and Social Processes. *Educational Psychologist, 45*, 15-27.

Johnson, R.T., D.W. Johnson, & M. Tauer (1979). The effects of cooperative, competitive, and individualistic goal structures on students' attitudes and achievement. *The Journal of Psychology*,*102*, 191-198.

Lemos, M.S. (1999). Students' goals and self-regulation in the classroom. *International Journal of Educational Research*, *31*, 471-485.

Linnenbrink, E.A. (2005). The dilemma of performance-approach goals: The use of multiple goal contexts to promote students' motivation and learning. *Journal of Educational Psychology*, *97*, 197-213.

Linnenbrink, E.A. & L.Z. Hruda (1999). *Student motivation and cooperative groups: Using achievement goal theory to investigate students' socio-emotional and cognitive outcomes*. Paper presented at the annual meeting of AERA Montreal, April, 1999.

Nolen, S. B., & C. J. Ward (2008). Sociocultural and situative research on motivation. In M. Maehr, S. Karabenick, & T. Urdan (Eds.), *Social psychological perspective on motivation and achievement. Advances in motivation and achievement* (Vol. 15, pp. 428–460). London: Emerald.

Ortiz, A., D.W. Johnson, & R. Johnson (1996). The effect of positive goal and resource interdependence on individual performance. *Journal of Social Psychology*, *136*, 243–249.

Pintrich, P.R. (2000a). An Achievement Goal Theory Perspective on Issues in Motivation Terminology, Theory and Research. *Contemporary Educational Psychology*, *25*, 92-104.

Pintrich, P.R. (2000b). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *The handbook of self-regulation: Theory, research and applications* (pp. 451-502). San Diego, CA: Academic.

Pintrich, P.R. & T. Garcia (1991). Student goal orientation and self-regulation in the college classroom. In M. Maehr & P. Pintrich (Eds.), *Advances in motivation and achievement: Goals and self-regulatory processes: Vol. 7. Goals and self-regulatory processes* (pp. 371-402). Greenwich, CT: JAI.

Rienties, B., Alcott, P., & Jindal-Snape, D. (submitted). *To self-select or not to self-select: that is the question in (culturally diverse) groups*.

Roeser, R.W. (2004). Competing schools of thought in achievement goal theory. In P.R. Pintrich & M.L. Maehr (Eds.), *Advances in Motivation and achievement: Vol. 13. Motivating Students, Improving Schools* (pp 265-300). Greenwich, CT: Elsevier-JAI.

Snijders, T.A.B., & R.J. Bosker, (1999). *Multilevel Analysis*. London: Sage.

Vauras, M., T. Iiskala, A. Kajamies, R. Kinnunen, & E. Lehtinen (2003). Shared-regulation and motivation of collaborating peers: a case analysis. *Psychologia: An International Journal of Psychology in the Orient*, *46*, 19-37.

Volet, S.E. & C. Mansfield (2006). Group work at university: Significance of personal goals in the regulation strategies of students with positive and negative appraisals. *Higher Education, Research and Development*, *25*, 341-356.

Volet, S., M. Vauras, & P. Salonen, (2009). Self- and Social Regulation in Learning Contexts: An Integrative Perspective. *Educational psychologist*, *44*, 215-226.

Wentzel, K.R. (1991). Social and academic goals at school: Motivation and achievement in context. In M.L. Maehr & P.R. Pintrich (Eds.), *Advances in motivation and achievement: Vol. 7. Goals and self-regulatory processes* (pp. 185-212). Greenwich, CT: JAI Press.

Wentzel, K.R. (1994). Relations of social goal pursuit to social acceptance, classroom behaviour, and perceived social support. *Journal of Early Adolescence*, *13*, 4-20.

Wentzel, K.R. (1996). Social and academic motivation in middle school: Concurrent and long-term relations to academic effort. *Journal of Early Adolescence*, *16*, 390-406.

Wentzel, K.R., Baker, S.A., & Russell, S.L. (2012). Young adolescents' perceptions of teachers' and peers' goals as predictors of social and academic goal pursuit. *Applied Psychology*, *61*, 605–633.Wilkerson, L. & W.H. Gijselaers (Eds.), *Bringing problem-based learning to higher education: Theory and practice*. San Francisco: Jossey-Bass.

Wosnitza, M., & Volet, S. E. (2009a). A framework for personal goals in social learning contexts. In M. Wosnitza, S. A. Karabenick, A. Efklides, & P. Nenniger (Eds.), *Contemporary motivation research: From global to local perspectives* (pp. 49–67). Go¨ttingen: Hogrefe.

Wosnitza, M., & Volet, S. E. (2009b). *Interface of personal goals with a social orientation and motivational patterns in collaborative learning contexts*. Paper presented at the EARLI conference, Amsterdam.

Wosnitza, M., & Volet, S. E. (2012). Group heterogeneity and homogeneity in personal content goals for a group learning activity: Impact on individual appraisals. *Applied Psychology, 61*, 585–604.