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Contemporary constructivist practices in higher education settings and academic motivational factors

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This study was aimed at assessing the relationships between college students' pre-entry factors, self-efficacy and motivation for learning, and the perceived constructivist learning in traditional lecture-based courses and seminars (SM). The study included 411 undergraduate third-year college students. Several scales were administered to the participants: The Constructivist Learning in Higher Education Settings scale (CLHES) aimed at measuring students' perceptions of occurrences of contemporary constructivist practices in learning environments, along three dimensions: constructive activity, teacher-student interaction and social activity; the Academic Motivation Scale - College (CEGEP); and the Motivated Strategies for Learning Questionnaire (MSLQ). Regression analysis main results showed that the constructive activity and teacher- student interaction factors were positively correlated. The teacher- student interaction variable was highly effective in enhancing intrinsic motivation for learning which in turn, contributed primarily to academic self-efficacy. The motivational factors were not solely affected by the learning environment perception but were also informed, to some extent, by several pre-entry factors.

Multivariate analysis of covariance results have corroborated the research hypothesis, indicating that students perceive seminar learning environments as more constructivist when compared with lecture-based course perceptions. Implications of these findings and directions for future research are discussed.

Keywords: *constructivist learning; academic self-efficacy; academic motivation*

Introduction

In the face of the growing Internet–based information, the fast development of technologies, social changes, globalization of education, and the pursuit of quality, it has become clear that students as adult learners must develop the ability to become lifelong learners by learning new skills and creating knowledge throughout their careers. Lifelong learning is defined as "all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competence, within a personal, civic, social and/or employment-related perspective" (EU, 2001: 9).

Being a lifelong learner involves not simply knowing existing practices, but also having the skills and will to search for new knowledge when needed, to move beyond existing routines, rethink key ideas, practices, and even values in order to change and adapt to changing circumstances. These types of renewal needs require developing updated instructional practices that could integrate knowledge with the personal transferable skills (Pellegrino & Hilton, 2012). In the field of higher education, the creation of learning environments based on the constructivist pedagogy is suggested to engage learners in knowledge construction learning, carried out by cooperative learning processes in real-world contexts (Schwarz & de Groot, 2011) while enhancing students' ability to regulate their learning (de Kock et al., 2004). The constructivist learning is often described as 'a holistic approach' (McGrath, 2007), aimed at educating for sustainable development, that is, offering learning experiences that are integrated into day-to-day personal and professional life. Compared to traditional instruction methods, in this authentic approach, educational efforts are purposely tailored to the goals and needs of the learner.

Despite the many theoretical appeals of comparing between these contradictory views of the learning environment, few are the empirically based discussions that focus on affective (rather than cognitive) variables connected to the constructivist learning process such as academic self-efficacy (Alt, 2014, 2015a, 2015b; Milner, Templin, & Czerniak, 2011; Tenenbaum, Naidu, Jegede, & Austin, 2001; Tynjala, 1998). Such efforts could demonstrate the wide range of positive effects attributed to constructivist environments.

This study represents an effort to elucidate current constructivist learning factors (Alt, 2014) and to examine the impact of these constructs on several motivational factors in two higher education settings - a traditional conventional lecture and a research-based seminar. This research design could challenge the relative contribution to learning outcomes attributed to the constructivist environment by comparing it with traditional environments' outcomes, thus, might strengthen the empirical evidence supporting the constructivist learning effectiveness.

Theoretical Framework

Contemporary Social-Constructivist Practices

Both cognitive constructivism and social constructivism perceive learning as an active process, where knowledge is constructed, not acquired. Yet, while cognitive constructivism is concerned with the individual's construction of knowledge, social constructivism stresses the collaborative processes in knowledge construction, thus, links social component to cognitive component of knowledge building (Windschitl, 2002). The ability to communicate, interact with others, listen to new ideas, express yours, synthesize, and develop new collective ideas is interwoven in the educational process of lifelong learning (EU, 2012). Current studies' classifications suggest three key tenets of the social-constructivist learning environment (Alt, 2014): *constructive activity, teacher-student interaction,* and *social activity*.

The first tenet (*constructive activity*) pertains to the process of 'learning to learn'. This principle is based on several educational dimensions. First is the idea that learning occurs during sustainable participation in inquiry practices focused on the advancement of knowledge. In these

learning processes learners are required to actively make meaning from information. Thus, learning is something students do rather than something that is transmitted to them (Ambrose, Bridges, Lovett, DiPietro, & Norman, 2010).

Authenticity is another dimension of the *constructive activity* tenet. Situating learning in a real world task ensures that learning is personally interesting (Erstad, 2011). McDougall (2015) maintains that this kind of learning is more meaningful and incisive, and produces high levels of engagement and positive learning outcomes compared with the traditional forms of content-based instruction. It equips students with skills needed for their future and encourages proactive learning experiences. Such learning experiences have relevance to real-world situations, not just the context of a formal education, and thus have direct relevance to the needs of adult learners (Lahn, 2011).

An additional dimension of the constructive activity tenet is providing multiple perspectives and representations of content. In the constructivist learning environment the student is encouraged to examine a phenomenon from several points of view (perspectives). When students are able to examine an experience from multiple perspectives their understanding and adaptability are increased (Lund & Hauge, 2011).

Another dimension of the first tenet is *in-depth learning*, characterized as allowing participants to focus on in-depth content knowledge (Evans, 2014). Through this constructive activity, learners could use their experience and knowledge to seek a clearer understanding of the learning materials, in contrast to surface learning which is confined to rote learning and memorising facts (Price, 2014).

In line with the final dimension of the *constructive activity* first tenet, content and skills should be understood within the framework of the learner's prior knowledge. Students' prior knowledge can help or hinder learning, therefore, teachers should leverage accurate knowledge in order to identify learning gaps and insufficiencies in students' prior knowledge that may not adequately support new knowledge. Furthermore, when prior knowledge is applied in the wrong context it may lead to students making faulty assumptions (Ambrose et al., 2010). Teachers should also create environments for teaching and

learning that are decompartmentalised, by integrating individual, social and institutional processes (Alt, 2014). According to this new interdisciplinary approach, learning is understood as the result of a mix between, meaning, experience retrieved from the past offering mediations to decipher present experience, and lessons learned from present inquiry turned towards a creative future (Perret-Clermont & Perret, 2011).

The second tenet (*teacher-student interaction*) is one of the main conceptual pillars of the constructivist pedagogy. The teacher is no longer perceived as the sole authority but as the facilitator of learning, guiding and supporting learners in the process of constructing knowledge. In these processes, students are given opportunities to actively engage in self- regulated learning (Järvelä, Hurme, & Järvenoja, 2011). Smith (2005) suggests that self- regulated skills are also essential for new employees who are better able to take charge of the conduct and accomplishments of their actions at work, that is, their ability to undertake the personal management of their actions and interactions that comprise their individual construction of knowledge for and through work.

Based on the final tenet (*social activity*), learning is a social activity in which individual learning processes are affected by personal characteristics as well as by external social factors, and meaning is constructed from the interaction between existing knowledge and social situations (Vygotsky, 1978). This process includes the promotion of communities of inquiry and dialogue skills through the use of forums of alternative voices and the induction of students into real dialogues across cultural differences (Vella, 2008). Cooperative learning is also supported by cognitive elaboration theories. Discussion of the subject matter during the process of peer work helps students verbalize and elaborate their initial, immature thoughts. In this process of elaboration, a student has an opportunity to develop ideas from vague to concrete and from preliminary to sophisticated. Discussions could lead to active processing of information and reprocessing of ideas, consequently, can help students learn better, retain information longer than working alone, and enhance their achievements (Snowman & Biehler, 2006).

Higher Education Course Types

Pedagogical design is the implementation of an underlying pedagogical approach and is manifested in course types that are used to achieve educational goals within a study track. As in other Western universities (Kiraly, 2014), in Israeli university Social Sciences programs two basic course types are traditionally used. First is the lecture type, designed to expedite the transmission of knowledge to large numbers of students. The teacher speaks to the students most of the time during a 90-minute lesson per week. This type of learning environment is associated with traditional instruction, or back-to-basics, which means following traditional teacher-centred methods used to be found in schools that society has traditionally deemed appropriate. This traditional 'banking' view of one-way traffic instruction is based on objectivist philosophical assumptions and encourages rote memorization (Beck, 2009). Licklider (2009) argues that despite decades of research about learning uncovering the limited effectiveness of this traditional teaching pattern, most educators focus on this teaching, which typically means conveying information.

Although the conventional lecture type has been consistently associated with the traditional one-way traffic instruction, Alt (2014) argues that several constructivist activities could be implemented in university lecture-based settings. For example, authentic real life examples can be integrated into a lecture-based course. Such implementations necessitate qualified teachers who have the special skills required for this instructional design.

The second course type is the Seminar. Seminars include intense study relating to the academic discipline to which an undergraduate student formally commits, and typically have significantly fewer students per professor than normal courses. The seminar involves independent research work, carried out by individual students and presented orally in the classroom. The final work is submitted to the teacher in a written form. Kiraly (2014) argues that, to some extent, seminars tend to parallel the lecture type of course regarding the type of interaction encouraged. Several introductory lectures on given topics are usually followed by students' presentations who read off their own lectures to the other classmates. The teacher is always present,

navigating the lessons, filling in knowledge uncovered by the presenters, and answering questions.

Despite the increased writing on learning environments, the potential differences between various forms of contemporary learning settings and the assessment of the use of constructivist activities in these settings are insufficiently explored (Tenenbaum et al., 2001).

Academic Self-Efficacy

Prior work has accumulated consistent empirical evidence supporting the view that self-regulation is a crucial predictor of academic achievement (Alt, 2014, 2015a, 2015b; van Dinther, Dochy, & Segers, 2011). Self-efficacy competence has been repeatedly linked to the psychosocial learning environment that students experience in their classrooms (Loyens, Rikers, & Schmidt, 2008). For example, a recent study (Donche, Coertjens, Van Daal, De Maeyer, & Van Petegem, 2014) showed how academic self-efficacy has a positive direct effect on first-year university students' deep learning engagement. Students' self-efficacy is considered a valuable explanatory factor in explaining differences in academic motivation and achievement. Carroll et al.'s (2009) study supports this premise. In their study, the relations between self-efficacy and academic achievement of 935 students aged 11-18 years from ten schools in two Australian cities were investigated. Results showed that academic and self-regulatory efficacy had a direct positive effect on academic achievement.

Academic self-efficacy is grounded in the broader psychological construct of the self-regulation theory, having evolved out of Bandura's (1986, 1977) social cognitive model of behaviour. This concept refers to personal judgements of one's ability to succeed at an academic task on a designated level or to attain a specific academic goal (Bandura, 1997). Accordingly, self-efficacy competence includes behavioural actions as well as the cognitive skills necessary for performance in a specific domain, and has been defined as "an individual's confidence in their ability to organize and execute a given course of action to solve a problem or accomplish a task" (Eccles & Wigfield, 2002: 110).

Academic Motivation and the Constructivist Learning Environment

The self-determination theory (SDT) (Deci & Ryan, 1985, 2008) defines the motivation behind the choices that people make and focuses on how social factors affect people's sense of volition and initiative, as well as their well-being and the quality of their performance. The SDT defines intrinsic and extrinsic sources of motivation, arranged on an internal-external continuum. Intrinsic motivation refers to internal factors, such as enthusiasm and pleasure experienced while engaging in a task. In contrast, extrinsic motivation refers to external factors, such as obtaining good grades or passing exams. It has been recognised that students rarely select one form of motivation during learning processes, but rather a combination of both orientations Thus, intrinsic and extrinsic motivations do not exist on a single continuum, but rather on two separate ones, and students may often have a variety of motivations for learning. Therefore, having a balance between intrinsic and extrinsic motivation could help shape a highly productive student (Deci & Ryan, 2008).

Studies on the effects of those motivations on learning strategies and achievements have associated controlled (extrinsic) motivation with surface processing and weak coping strategies in the case of failing (Ryan & Connell, 1989). Autonomous (intrinsic) motivation has been found directly and positively connected to a deep approach to learning, that is the use of more information processing, high concentration while studying and better time management, and indirectly to higher academic achievement (Vansteenkiste, Zhou, Lens, & Soenens, 2005).

Nijhuis, Segers and Gijselaers (2005) maintain that learning approaches are not considered to be stable psychological traits, and are not independent of the characteristics of the learning environment. Learning approaches can be modified by the teaching context or learning environment. For example, constructivist learning environments have been associated with deep approaches to learning (Rikers, Van Gog, & Paas, 2008). Therefore, this study explores the connections between the learning context and the learners' personal characteristics of intrinsic and extrinsic motivations that may impact the students' learning outcomes.

The Present Study

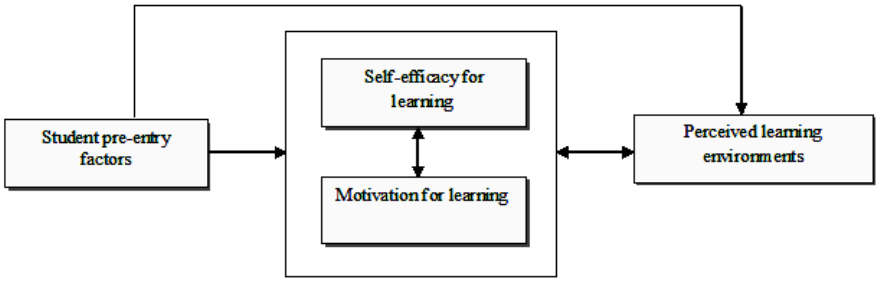
This study assesses the relationships between college students' self-efficacy and motivation for learning, and perceived constructivist learning in traditional- and constructivist- based environments. The research presented in this article focuses on the following research aims and questions:

a. The first aim is to measure the set of connections between students' perceptions of their learning environment, their motivation, and perceived self-efficacy for learning and their pre-entry factors. Fig. 1 demonstrates the structure of the proposed theoretical model.

b. The second aim is to assess more specifically which of the perceived learning environment, motivation, and self-efficacy for learning factors, differentiate regarding the course setting (lecture-based environment [LBE], seminar [SM]). Because SM settings are conceived as excellent ways by which constructivist activities could be fostered (Alt, 2014), it is hypothesized (*H1*) that these environments will be highly connected to students' constructivist learning perceptions, motivation, and self-efficacy for learning factors, compared with LBE.

The influence of variables such as gender, age, and SES on the above perceptions will be also addressed.

Figure 1. *Model 1. The theoretical structure of the proposed framework*



Method

Participants

The questionnaires were submitted to 411 undergraduate third-year students (12.4% males and 87.6% females) from one major college in the Northern Galilee, of whom 40.8% were Jewish students and 59.2% Muslim students, with a mean age of 24.5 (SD=4.4) years. The distribution of the participants with respect to the course settings (Course groups) was as follows: 42% LBE students (enrolled in three randomly selected courses), and 58% seminar course students (SM) (enrolled in eight randomly selected courses). The sample reflected the faculty enrolment breakdown of the campus, composed as follows: Education – 59%, Criminology – 15.2%, Sociology – 7.3%, Management - 9.3%, Economics – 5.3%, Behavioural Sciences – 1.4%, Political Sciences1.4 - %, and Communication – 1.1%.

Instrumentation

Pre-entry characteristics.

Data were gathered using a questionnaire aimed at measuring the student's cultural group, gender, age, socioeconomic status, and prior education achievements. Students' socioeconomic status (SES) was assessed by the father's educational attainment (FEA) and the mother's educational attainment (MEA), both defined on a six-level scale: 0 = *lack of education* to, 1 = *elementary school*, 2 = *high school*, 3 = *BA degree*, 4 = *MA degree*, 5 = *doctoral degree*. Another SES factor was the participants' report on their family current economic condition (EC), defined on a six-level scale: 1 = *extremely difficult* to 6 = *comfortable, no financial worries*. Finally, students' prior education achievements were measured by their self-reported average score of the matriculation exams (MAT).

Academic motivation.

Academic motivation was measured by two constructs from the Academic Motivation Scale - College (CEGEP) version (Vallerand, Blais, Brière, & Pelletier, 1989): Intrinsic motivation (four items), for example: 'I go to college because I experience pleasure and satisfaction

while learning new things' (Cronbach's alpha equals to 0.79); and extrinsic motivation (four items), for instance: 'I go to college because with only a high-school degree I would not find a high-paying job later on' (Cronbach's alpha equals to 0.70). The overall scale included eight items scored on a 5-point Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*.

Academic self-efficacy.

An eight-item scale using items derived from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & Mckeachie, 1993) was used to assess perceived academic competence in the students' learning environments. The MSLQ was originally designed to measure college undergraduates' motivation, self-regulated learning perception and learning strategies. The MSLQ is modular, thus allows using the subscales separately, as has been the case in the present study, which used only the academic self-efficacy subscale. All items were scored on a 5-point Likert scale with anchors of 1 = *strongly disagree* to 5 = *strongly agree*. For example, 'I'm certain I can master the skills being taught in this course.' (Cronbach's alpha = 0.92).

The Constructivist Learning in Higher Education Settings [CLHES] Questionnaire.

This new 36-item scale was designed by (Alt, 2014) to obtain measures of students' perceptions of the occurrence of constructivist practices in higher education learning environments. All items were scored on a 5-point Likert scale from 1 = *not at all true* to 5 = *completely true*. Table 1 indicates the CLHES factors, sub-factors, item descriptions and internal consistencies (Cronbach's alpha). Each of the eight resulting factors showed a very high internal consistency. Convergent validity has been shown by statistically significant and positive bivariate correlations between all factor pairings ($.157 < r < .616$; $001 < p < .05$).

Table 1. *The CLHES questionnaire: factors, sub-factors, item descriptions and internal consistencies (Cronbach's alpha)*

Factors and sub-factors	**Item**	**Cronbach's alpha**
Constructive activity (F1) Knowledge construction (A1)	c3. During this course, I was given opportunities to search for possible explanations for real problems	(five items) .85
Constructive activity (F1) In-depth learning (A2)	c6. In this course, I have learned skills with which I can deeply explore a subject of interest to me	(four items, item c10 was omitted due to a low loading result) .81
Constructive activity (F1) Authenticity (A3)	c18. The course addressed real life and interesting events	(five items) .83
Constructive activity (F1) Multiple perspectives (A4)	c21. In this course, ideas were presented from several points of view	(four items, item c25 was omitted due to a low loading result) .77
Constructive activity (F1) Prior knowledge (A5)	c27. The subjects learned in this course were related to prior knowledge I have gained	(four items, item c30 was omitted due to a low loading result) .82
Teacher- student interaction (F2)	c15. In this course, the teacher made me think about the advantages and disadvantages of my learning	(five items) .89
Social activity (F3) Social interaction (H1)	c31. This course included a variety of learning activities with other students	(three items) .90
Social activity (F3) Cooperative dialogue (H2)	c36. In this course, I could express my opinion, even when it was different from other students	(three items) .84

Structural equation modelling (SEM) (Bentler, 2006) was employed to further assess the construct validity of the CLHES, using a confirmatory factor analysis. Data used for the SEM were analysed by the maximum likelihood method. Three fit indices were computed in order to evaluate the model fit: $\chi 2(df)$, ($p > .05$), CFI (> 0.9), and RMSEA (< 0.08).

The measurement model which is included in the structural model (Figure 2) contains the following factors: First, the *constructive activity* (F1) latent variable accompanied by five latent variables: *knowledge construction* (A1) with five observed items, is described as multiple opportunities given to students to investigate real problems, raise questions and search for possible explanations while using various methodological approaches; *in-depth learning* (A2) with four observed items, pertains to the extent to which students are given opportunities to deeply explore a certain subject matter, rather than engaging them in a surface learning; *authenticity* (A3) with five observed items, deals with giving relevant meaning to the learned concepts and addressing real life and interesting events which are related to the studied topic; *multiple perspectives* (A4) with four observed items, refers to presenting complex ideas from several points of view; and *prior knowledge* (A5) with four observed items, deals with connecting the subject materials to other courses' topics. The second factor is the *teacher- student interaction* (F2) latent variable accompanied by five observed variables, refers to the teacher's role which includes guidance towards reflection on learning processes. Third factor is the *social activity* (F3) latent variable accompanied by two latent variables: *social interaction* (H1) with three observed items, which includes a variety of learning activities with other students, such as learning with other students, not necessarily during a lesson; and *cooperative dialogue* (H2) with three observed items, which refers to dialogical activities during the lesson in which students can express opinions and original ideas. items: c10, c25, and c30 were omitted due to low loading results (< .30) The goodness of fit of the data to the model is shown in the *finding* section.

Procedure

The scales were administered to the participants near the end of their courses - at the second semester of the third year of studies. The students were told that the purpose of the study was to examine their

perceptions of the course. Prior to obtaining participants' consent, it was specified that the questionnaires were anonymous and that no pressure would be applied should they choose to return the questionnaire unfilled or incomplete. Finally, participants were assured that no specific identifying information about the courses would be processed.

Findings

First Research Aim

In order to assess the first research aim, several stepwise regression analyses were employed; their results are presented in Table 2. In Model 1 (Table 2), the dependent variable of self-efficacy for learning (SE) was regressed on all the pre-entry variables: Cultural group (CG - Jewish = 1 Muslim = 2), age, gender, mother's (MEA) and father's (FEA) educational attainment, economic condition (EC), and the average score of the matriculation exams (MAT); the three CLHES factors: *constructive activity* (F1), *teacher- student interaction* (F2) and *social activity* (F3); and the motivational factors: extrinsic (EXT) and intrinsic (INT). As shown in Table 2, six factors have positively affected the academic self-efficacy variable (SE), with a relatively higher result indicated for the intrinsic motivation variable ($\beta = .42$, $p < .001$), which explained 18% of the variance. In Model 2, intrinsic motivation was entered as a dependent variable and was regressed on all the pre-entry variables, extrinsic motivation, academic self-efficacy, and the three CLHES factors. The *teacher- student interaction* factor (F2) accounted for 30% of the variance, with the highest positive connection coefficient result. In Model 3 (Table 2), extrinsic motivation was regressed on the same variables as in Model 2, with an additional factor of intrinsic motivation, which accounted for only 8% of the variance, with a positive low connection result. Model 4 included the *constructive activity* factor (F1) as a dependent variable which was regressed on the pre-entry variables, extrinsic and intrinsic motivations, academic self-efficacy, *teacher - student interaction* (F2) and *social activity* (F3). As shown in Table 2, *teacher- student interaction* (F2) accounted for 56% of this model variance, with a positive moderate connection result. Similarly, in models 5 and 6 *teacher- student interaction* (F2) and *social activity* (F3) were entered as dependent variables, respectively. In both models, *constructive activity* factor (F1) was found to be the most effective variable with the highest positive connection coefficient results.

Table 2. *Summary of stepwise regression analyses*

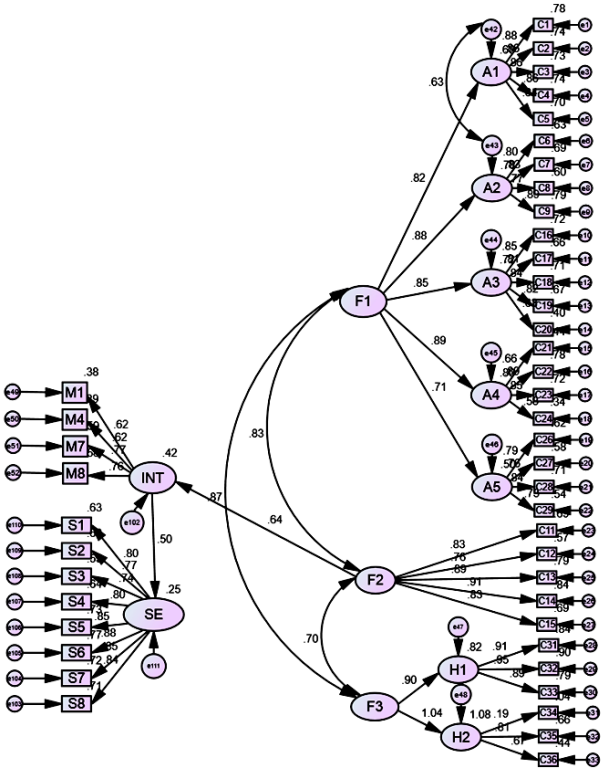
Model	Independent variables	B	SE. B	β	ΔR^2	F	R^2	Dependent variables
1	INT	.36	.04	.42***	.18	83.17***	.29	SE
	F1	.21	.05	.24***	.04	54.39***		
	EC	.10	.03	.16***	.03	41.81***		
	Age	.03	.01	.15***	.02	35.15***		
	EXT	.12	.04	.13**	.01	30.18***		
	F2	.10	.05	.15*	.01	26.22***		
2	F2	.43	.03	.54***	.30	167.25***	.43	INT
	CG (Muslim)	.38	.07	.24***	.05	106.10***		
	SE	.25	.05	.22***	.04	83.43***		
	F1	.23	.06	.23***	.02	68.74***		
	MAT	.07	.02	.11**	.01	57.68***		
	EXT	.11	.04	.10*	.01	49.69***		
3	INT	.27	.05	.29***	.08	35.64***	.15	EXT
	Age	-.03	.01	-.17***	.03	25.10***		
	SE	.16	.06	.15**	.02	19.85***		
	CG (Muslim)	.20	.08	.13*	.02	16.77***		
4	F2	.40	.03	.50***	.56	503.75***	.68	F1
	F3	.31	.03	.37***	.11	403.76***		
	INT	.12	.04	.12**	.01	280.50***		
	F1	.79	.05	.64***	.56	503.75***	.59	F2
5	INT	.25	.05	.20***	.03	282.37***		
6	F1	.77	.04	.66***	.43	303.77***	.43	F3

*Note: p < .05 * p < .01** p < .001****

It can be learned from these analyses that the *teacher- student interaction* (F2) variable was highly effective in enhancing intrinsic motivation, which in turn contributed primarily to academic self-efficacy. The *teacher- student interaction* (F2) and *constructive activity* (F1) factors were highly correlated. The *social activity* (F3) factor was merely connected to the *constructive activity* (F1) factor. Some pre-entry variables (EC, MAT, CG, and Age) have slightly explained the motivational factors, however, were insignificantly connected to the perception of the learning environment factors. Based on these analyses,

Model 2 (Figure 2) was constructed. The model included the CLHES latent factors and observed items, as described above. In addition, the self-efficacy (SE) and intrinsic motivation (INT) factors were also entered into the model ($\chi 2$ = 2167.655, *df* = 932, *p* = .000; *CFI* = .916; *RMSEA* = .057). It can be learned from Figure 2 that the *teacher-student interaction* (F2) and intrinsic motivation factors are highly connected (β = .64, *p* < .001); the latter and academic self-efficacy are moderately related (β = .50, *p* < .001). The *teacher- student interaction* factor explained 42% of the intrinsic motivation factor variance, which in turn explained 25% of the academic self-efficacy variance.

Figure 2. Model 2 with standardised parameter estimates



Second Research Aim

In order to assess the second research aim and *H1*, multivariate analyses of covariance (MANCOVA) with Wilks' Lambda criterion were

applied to allow the characterization of differences between the Course groups (LBE and SM) in regard to: (1) a linear combination of the multiple eight dependent factors of the CLHES scale; and (2) a linear combination of the motivational and self-efficacy for learning factors.

The following factors were entered as covariates in order to assess how these variables intersect and may contribute to the dependent variables: Cultural group (CG: *Jewish = 1 Muslim = 2*, age, gender (*Males = 1 females = 2*), mother's (MEA), father's (FEA) educational attainment, EC and the average score of the matriculation exams (MAT).

Table 3. *Mean scores, SD, F values, Wilks' Lambda and partial Eta-squared statistics (ηp2) of the two Course groups (LBE and SM) on the eight CLHES scale factors and academic self-efficacy and motivational variables.*

	Factors		LBE		SM			
			M	SD	M	SD	F	η_p^2
MANCOVA Wilks' Lambda statistic (Main effect)		Course					53.21***	.524
Wilks' Lambda statistic (Covariate)		CG (Muslim)					3.57**	.069
ANOVA	1	A1	2.16	0.89	3.87	0.70	390.22***	.498
	2	A2	2.65	0.96	3.97	0.66	226.89***	.366
	3	A3	3.25	1.00	3.95	0.67	53.98***	.121
	4	A4	3.04	0.86	3.70	0.67	57.10***	.127
	5	A5	3.03	0.94	3.67	0.73	45.05***	.103
	6	F2	2.81	1.00	3.70	0.80	77.11***	.164
	7	H1	2.46	1.03	3.36	1.04	58.59***	.130
	8	H2	3.15	1.08	3.81	0.81	40.73***	.094
MANCOVA Wilks' Lambda statistic (Main effect)		Course					7.12***	.052
Wilks' Lambda statistic (Covariate)		CG (Muslim)					20.87***	.138
		Age					8.38***	.060
ANOVA		SE	3.73	0.79	4.06	0.56	11.68**	.029
		INT	3.24	0.80	3.67	0.72	16.54***	.040
		EXT	3.73	0.72	3.84	0.75	.913	.002

*Note: p < .05 * p < .01** p < .001****

Knowledge construction (A1); *In-depth learning* (A2); *Authenticity* (A3); *Multiple perspectives* (A4); *Prior knowledge* (A5); *Teacher-student interaction* (F2); *Social interaction* (H1); *Cooperative dialogue* (H2)

Table 3 shows the mean scores, standard deviations, *F* values, Wilks' Lambda and partial Eta-squared statistics of the analyses. Results indicated significant differences between the Course groups regarding the combination of the multiple CLHES factors and separately on each of them. All the between- group differences were accompanied by moderate to large effect sizes when small, moderate, and large effects are reflected in values of ηp2 equal to .0099, .0588, and .1379, respectively (Richardson, 2011: 142).

As presented in Table 3, salient between- group differences were indicated for the factors: *Knowledge construction* (A1) (ηp2 = .498) and *in-depth learning* (A2) (ηp2 = .366). Somewhat lower effect sizes were found for the *teacher- student interaction* factor (F2) (ηp2 = .164), s*ocial interaction* (H1) (ηp2 = .130)*, multiple perspectives* (A4) (ηp2 = .127), *authenticity* (A3) (ηp2 = .121), and *prior knowledge* (A5) (ηp2 = .103). The relatively lowest effect size was found for the *cooperative dialogue* (H2) (ηp2 = .094) factor. On each factor, the lowest mean result was indicated for the LBE group and the highest for the SM group. Regarding the motivational and academic self-efficacy factors, differences were found between the Course groups on the intrinsic motivation (ηp2 = .040) and self-efficacy (ηp2 = .029) variables, both accompanied by low effect sizes. Insignificant Course group differences were indicated for the extrinsic motivation variable. Lastly, the covariate of CG (Muslim) was positively connected to the perception of the learning environment (ηp2 = .069), and to the motivational factors (ηp2 = .138). The age covariate was found to be related to the motivational factors (ηp2 = .060).

Discussion and Implications

The overarching goal of this study was to measure the set of connections between students' perceptions of their learning environment, their personal characteristics of motivation and perceived self-efficacy for learning, and several pre-entry factors. The second goal was to assess the effect of two learning environments: lecture-based and seminars on the above perceptions.

First Research Aim

Regression analysis main results showed that the *constructive activity and teacher- student interaction* factors were positively correlated. The *teacher- student interaction* variable was found highly effective in explaining intrinsic motivation for learning which in turn, contributed primarily to academic self-efficacy.

These findings indicate that stimulating meta-cognitive and reflective aspects of learning could bolster the students' confidence in their ability to accomplish an inquiry-based task which requires higher order thinking skills. Constructivist environments provide skills for abstract thinking and reflective multi-perspective examination of an issue, which allow the students to construct essential information for themselves rather than being provided with information that fully explains the concepts and procedures that they are required to learn (Alt, 2014). In addition to information construction, such skills, as indicated by the present study's results, could develop a strong sense of self-efficacy, and encourage students to reflect on and interpret their learning capabilities, as suggested by the first and dominant source of self-efficacy enactive mastery experiences (Bandura, 1997). Studies indicate that students who develop strong academic self-efficacy beliefs are more likely to successfully complete their education and be better equipped for a variety of occupational options in today's competitive society (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001; Carroll et al., 2009; Donche et al., 2014; Loyens et al., 2008).

Second Research Aim

Multivariate analysis of covariance results have corroborated the research hypothesis (*H1*), indicating that students perceive SM learning environments as more constructivist when compared with lecture-based course perceptions. However, the findings also showed that the *social activity* sub-factor of *cooperative dialogue* was accompanied by a relatively low effect size. This finding could suggest that SM settings are less consistent with this key feature of the constructivist pedagogy. Kiraly (2014) maintains that in practice, seminars and lectures tend to share certain objectivist characteristics: the teacher acts as a knowledge conduit regardless of the class type and most of the practice work is done by students alone rather than in groups. Communication

among the students themselves is usually considered unnecessary or undesirable.

Another plausible explanation for the above finding could be that social activities, such as dialogues, are also applied, to some extent, in lecture-based environments, in accordance with previous findings (Alt, 2014), there are teachers who encourage students participation in the classroom. These teachers intuitively recognize that education is a constructive acculturation process rather than a process of reflecting reality (Kiraly, 2014).

Regarding the motivational and academic self-efficacy factors, the multivariate analysis result showed a low positive impact of the SM course on the intrinsic motivation and self-efficacy variables. It could be inferred that the different activities and instructional methods taking place in the classroom, compared to the lecture-based course, highly impact the students' perception of what is happening during the lessons, in terms of perceptions of constructive activities. However, in conjunction with the regression analysis results, the motivational factors were not solely affected by the learning environment. These factors were also connected to some pre-entry factors, such as the cultural group, age, and economic condition.

It can be concluded that students' perceptions of the learning activities in their classrooms could be related to their enrolment in different learning settings (SM or LBE). These perceptions might have an impact on students' motivational factors - which are also partially connected to some pre-entry factors. In accordance with previous research (Nijhuis et al., 2005; Rikers et al., 2008), this study mainly shows that the student's psychological traits are not independent of the characteristics of the learning environment, and are partially connected to the learning setting context.

Conclusions and Limitations

This study underscores the importance of interpersonal relationships to students' psychological outcomes, specifically, the significant role of *teacher-student* relationships in enhancing intrinsic motivation and self-efficacy for learning is recognized in this study. Yet, some limitations of the present investigation and directions for future research must be

noted. First, future research should consider expanding the model tested here with additional variables that could be related to learning activities such as, students' approaches to studying and learning (Biggs, Kember, & Leung, 2001). These variables could be related to learning setting perceptions and academic motivation psychological variables, therefore assessing them in conjunction with the present study examined constructs could allow measuring additional constructivist environment effects on a wider range of psychological constructs.

Second, some studies point to several factors that limit the effectiveness of constructivist learning settings (Baeten, Kyndt, Struyven, & Dochy, 2010; Gijbels, Segers, & Struyf, 2008; Kyndt, Dochy, & Cascallar, 2014). For example, Kyndt et al.'s (2014) main premise is that these learning environments demand too much from the students in terms of workload and task complexity, in these cases inducing an effective learning could be difficult. Thus, it seems important to detect possible relations between the learners and their social learning environment that could encourage them to become self-regulatory and support their confidence and ability to excel in *complex tasks* required for constructivist learning.

Third, this study was conducted in a single country, meaning that the results cannot necessarily be generalized. Therefore, larger population studies are needed to validate these findings, and more research on this topic needs to be undertaken before the associations between the perceived learning environment and psychological factors are more clearly understood.

Research Implications

These research findings indicate that stimulating meta-cognitive and reflective aspects of learning could strengthen students' confidence in their ability to excel in inquiry-based task. Accordingly, this study suggests that constructivist educators should be aware of the importance of pursuing this outcome by motivating students to think reflectively. Through this process of evaluating their own performance as learners, students could become, as suggested by this study, more confident in their ability to execute assignments.

In accordance with the constructivist theory, interaction is perceived to be one of the most important components of the learning experience, in

which students are given sufficient opportunities to express themselves and to share their own experiences with others (Järvelä et al., 2011). This process may promote dialogue skills through the use of forums of alternative voices, which allows the learners to reflect on their own work and to make independent use of their results thus being able to perform more effectively. Yet, based on this study results, *cooperative dialogue* activities were inadequately practiced in seminars. This course type is conceived as an excellent way by which a community of learners could be built, interdisciplinary research-based settings could be promoted, and student-centred activities, where students themselves could take a key role in creating the research/learning link, could be fostered (Alt, 2014). Therefore, this study suggests that educators should be aware of the importance of facilitating cooperative tutorial study groups in order to create a well-functioning environment and meaningful knowledge construction, as well as to nurture self-efficacious learners in higher education studies. This conclusion is also corroborated by this research empirical model in which the *social activity* factor was positively related to the *constructive activity* factor.

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