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EDUCATIONAL ASSESSMENT & EVALUATION | RESEARCH ARTICLE

The role of individual processes and learning environment in the prediction of grades in a sample of Norwegian students

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Abstract: Student grades are traditionally used to evaluate academic achievement in higher education. A review of previous research indicates a relatively clear tendency to adopt either an individual or contextual approach in exploring this subject. The present study represents an attempt to simultaneously examine effects of individual variables and learning environment on academic achievements as measured in grades. The study adopts a quantitative approach and reports data collected from students enrolled in early childhood education in a mid-sized university in Norway. Results of a stepwise hierarchical regression demonstrate that individual variables (e.g. nonmandatory school attendance, self-efficacy, and behavioral intentions) predict academic achievements. However, the regression analysis also shows a virtually non-existing relationship between learning environment variables and grades. Discussing this somewhat surprising finding, we argue that the association between learning environment and grades are mediated by individually based characteristics. Limitations and implications of the study are also examined.

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PUBLIC INTEREST STATEMENT

Individual student characteristics and the learning environment are two important factors that influence school grades. Individual student characteristics used in the present paper consist of variables such as voluntary attendance, student's belief in his/her ability to complete a task, and behavioral intentions. Learning environment consist of processes such as occupational socialization, professional socialization, organizational citizenship behavior, and perceived justice and support. Data were gathered using a questionnaire during two different measuring points (i.e. in the beginning and at the end of the semester). The participants were students enrolled in the early childhood education program at a mid-sized university in Norway. Actual grades, provided by the university administration, were collected at the end of the semester. Results show that student characteristics predict grades, while learning environment does not. However, we argue that learning environment is nevertheless important for student grades, depending on the degree/way in which environment influences individual characteristics.

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1. Introduction

Grades represent a widespread use of summative assessments that are traditionally used to evaluate the degree of academic achievement during a predefined period of time. Although summative assessments of academic achievements as measured in grades certainly represent dubious checks of the students' development, the importance and the widespread usage of pinpointing levels of learning in this manner is real and global. Considering that attaining grades per definition involves a prolonged timeframe, it is obvious that the potential number of processes that might influence student grades is huge. Thus, there exist virtually dozens different environmental, motivational, cognitive, and personality variables which are expected to be significantly associated with grades (see Richardson, Abraham, & Bond, 2012 for a meta-analytic review). It therefore comes as no surprise that relationship between plausible theoretical candidates and academic achievements represents a well-explored area of research (Boulter, 2002; Elliot, McGregor, & Gable, 1999; Martin, 2007; Robbins et al., 2004; Sheard, 2009). Reviewing this research, it is possible to argue that there exist two different levels of analysis concerning this topic (Richardson et al., 2012; Robbins et al., 2004). The first one encompasses a set of motivational or dispositional variables that are expected to be associated with student achievements. This approach primarily focuses on learner's individual characteristics in terms of cognitions, motivations, and behavior, and the manner which these dispositions influence learning outcomes (Brown et al., 2008; Credé & Kuncel, 2008; Elias & Loomis, 2002; Harackiewicz, Barron, Tauer, & Elliot, 2002; Kovač, Cameron, & Høigaard, 2016; Trapmann, Hell, Hirn, & Schuler, 2007). Notwithstanding evident contributions, it is fair to say that the explicit research focus on dispositional aspects of student characteristics tends to be narrow, usually on the expense of the processes that reside in the learning context and proximate learning environment (LE). The second approach emphasizes contextual aspects of LE and includes variables that construct a frame or background that supports academic results (Bean, 1985; Samdal, Wold, & Bronis, 1999; Tinto, 1975). Studies that adopt this point of departure primarily tend to focus on abstract aspects of educational environment such as organizational and learning climate and relationships among learners. However, this line of research that predominantly focuses on the environmental features of the educational context typically tends to omit learner's individual and dispositional characteristics that influence learning outcomes. Thus, considering the prevailing tendency to adopt either individual or contextual approach, investigations that simultaneously examine both aspects of student achievements are warranted.

Attempting to take on a broader theoretical approach, collected data in the present study is based on several individual and LE variables that are expected to be connected to academic achievements as measured in grades. Thus, the present study represents an attempt to combine these two perspectives and simultaneously examine the relative impact of (1) individual variables and (2) LE on student actual grades in the context of Norwegian higher education.

2. Individual variables

Individual variables included in the present study refer to personal dispositions that are in lesser degree related to contextual influences embedded in the given LE. To increase construct validity of these measures, individual variables are assessed in groups (i.e. two or three comparable yet distinct variables measuring the same overarching process). The variables included in the present study are: student learning efforts (action planning, academic self-efficacy, and quantity of invested academic work), class attendance (habitual and nonmandatory), and behavioral intentions (to get specific grade and to quit studying). Clearly, many variables possess both individual and contextual aspects and consequently may be conceptualized as such. In order to avoid the blur between the two levels, the operationalization of variables as individual in the present study

was carried out in the manner that precludes influence of contextual or environmental factors. This is achieved by formulating items that emphasize dispositional aspects of included variables (see example, items in the section "measures").

The first group of individual variables in the study refers to student learning efforts consisting of action planning, self-efficacy beliefs, and the quantity of time invested in doing required academic tasks. The notion of *action planning* (Sniehotta, Scholz, & Schwarzer, 2006) is similar to the concept of implementation intentions (Gollwitzer, 1999) that specifies planning process with the aim of securing the execution of a given behavior. Thus, action planning stipulates circumstances in terms of when, where, and how a particular behavior is to be performed. *Self-efficacy* is connected to the confidence an individual have to successfully perform a certain task (Huang, 2011). It is widely acknowledged that self-efficacy beliefs are most informative when they are linked to one's performance in a specific domain (Bandura, 1997). Hence, in the present study we measure academic self-efficacy that refers to personal beliefs in the ability to organize and execute actions to attain desired levels of academic performance (Multon, Brown, & Lent, 1991; Zimmerman, 1995). The positive effects of academic self-efficacy on academic achievements are well documented (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Chemers, Hu, & Garcia, 2001; Schunk, 1994; Valentine, DuBois, & Cooper, 2004; Zimmerman & Bandura, 1994). In addition to action planning and self-efficacy beliefs, we also asked students to report the *invested efforts* in terms of quantity of time they spend studying during the week. The rationale for including this measure is that the concept of self-efficacy beliefs primarily reflects confidence in attaining the specific goal, and as such does not necessary reflect efforts actually invested in behavioral performance.

The second pair of individual predictor variables that we expect are significantly related to student grades refer to school attendance. In general *school attendance* is in current literature frequently positively associated with academic achievements (Brocato, 1989; Lin & Chen, 2006; Moore et al., 2003). Meta-analytic reviews reinforce the importance of regular class attendance in the prediction of student grades, even after other individual student characteristics are considered (Credé, Roch, & Kieszczynka, 2010; Moore et al., 2003). The measure of school attendance in the present study is based on self-reported attendance in terms of automatic or habitual processes (Verplanken & Orbell, 2003). However, the traditional measures of regular school attendance typically provide little information about motivational processes that fuel a certain behavior. One of the processes that are particularly relevant for school attendance is the degree in which behavior is voluntary performed. Hence, in addition to measure of habitual school attendance (HSA), we have also included an item that measures the degree in which students *attend non-mandatory lectures.*

The third pair of individual variables that we expect are significantly related to student grades consists of two types of intentions, namely intentions to get a specific grade and intentions to quit studying. Although intention certainly represents a complex idea in terms of underlying processes (Malle & Knobe, 1997) and stability (Sheeran, 2002), the idea of premeditation is clearly theoretically linked to human actions. Thus, the concept of intention is in contemporary literature frequently identified as the most important determinant of volitional behavior (Ajzen, 1991). The notion of the behavioral intention captures the motivation to engage in future actions and reflects individual's conscious decision to exert effort to perform the given behavior. Based on previous research, we expect that *intentions to get specific grades* represent a significant predictor of actual grades. However, intentions to get specific grade refer only to volitional processes that lead to desired outcomes. These types of intentions measure deliberative processes that presuppose interest in attaining a selected goal. It follows that this measure would not sufficiently encompass those students who struggle with motivation to complete studies. Hence, in the present study we also included a measure of *intention that assesses quitting process* (i.e. intention to quit studying current courses).

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3. LE variables

The LE variables refer to processes that are in larger degree associated with contextual influences. The inclusion of contextual variables is logical considering that an increasing amount of research suggests that the presence of a supportive LE is important for high academic achievement (Eccles, Wigfield, Schiefele, Damon, & Eisenberg, 1998; Maehr & Anderman, 1993; Ryan & Patrick, 2001; Wang & Holcombe, 2010). Based on previous research, we hypothesize that there exists a statistical association between perceptions of supportive and cooperative learning contexts and academic achievements. The idea is that LE that provides opportunities for the students to develop a sense of personal competence and positive relationships with others should be positively associated with optimal learning outcomes (Reve, 2002). LE variables included in the present study are: professional socialization (occupational and class), organizational citizenship behavior (OCB) (civic, help, and sportsmanship), and learning climate (perceived justice and learning orientation).

The first LE variable refers to two distinct aspects of professional socialization (Adams, Hean, Sturgis, & Clarke, 2006). The rationale for inclusion of professional socialization in LE variables is the way specific contexts and the person's place/role in these particular contexts tend to influence behavior. Kindergarten teacher students learn professional characteristics within a specific educational setting, adopting and internalizing these features in a unique way (Beijard, Meijer, & Verloop, 2004). The first aspect, *occupational socialization*, refers to the students` conscious awareness of oneself as a kindergarten teacher in terms of internalizing knowledge, skills, attitudes, and values that are characteristics of members of the profession (Adams et al., 2006). Occupational socialization is known to have a positive relation to commitment to work, professionalism, and occupational success (Beauchamp & Thomas, 2009). Based on this, we expect that a strong social identification with kindergarten teacher occupation should have a positive effect on student grades. The second aspect of professional socialization is associated with student's relation to *their class* in the early childhood education. Teaching classes can be an example of contexts where students in various degrees develop connections to other fellow students within a class. The connection between students in a class is associated with academic engagement (e.g. Anderman & Anderman, 1999; Furrer & Skinner, 2003; Wentzel, 1998). It follows that it is more likely that students put efforts in their work when they are recognized by others in given social setting (Ryan & Patrick, 2001).

The second LE variable that is included in the present study is the OCB. OCB is defined as "*performance that supports the social and psychological environment in which task performance takes place*" (Organ, 1997, p. 95). Thus, the definition explicitly associates OCB with task performances regardless of the effect of potential formal rewards. The concept of OCB is divided in three conceptually distinct dimensions (Podsakoff, Ahearne, & MacKenzie, 1997): *helping climate* (e.g. voluntarily helping others with an organizationally relevant task or problem), *civic virtue* (e.g. responsive, constructive involvement in the organization), and *sportsmanship* (e.g. the willingness to tolerate the inevitable inconveniences and impositions of work without complaining). Previous research found positive association between OCB and academic achievement (Allison, Voss, & Dryer, 2001). Thus, the belief that distinct components of OCB also may exert an influence on grades is warranted.

The third LE variable refers to learning climate that characterize the given learning setting. The first aspect of learning climate is *perceived justice and support* which refers to expressed perceptions fairness, support, and help that teachers create in their classrooms (Roberts & Clifton, 1992). In addition, perceived justice also refers to fairness of the procedures by which outcomes are determined (Lind & Tyler, 1998). Previous research has focused on subjective perceptions related to (a) the fairness of outcome distribution or allocations; i.e. distributed justice, and (b) the fairness of the procedures used to determine outcome distributions; i.e. procedural justice (Greenberg, 1990). Although investigations of students' perception of justice and teacher's support are relatively scarce, there are nevertheless grounds to expect that helpful learning climate would be associated with performances as measured in grades (Cohen-Charash & Spector, 2001; Colquitt,

Conlon, Wesson, Porter, & Ng, 2001). The second aspect of learning climate is basic learning orientations that characterize most educational settings. According to achievement goal theory (Ames, 1992; Nicholls, 1989), there exist two basic ways in which students perceive and define their school's social climate and learning, namely mastery orientation and performance orientation. In the present study, we included the measure of *mastery learning orientation* that characterize student's learning context in the form of stimulation of intrinsic motivation and general class support.

3.1. Hypotheses
In sum, we sought to test the following hypotheses:

1. We hypothesize that academic achievements as measured in grades are significantly predicted by individual variables.
2. We hypothesize that academic achievements as measured in grades are significantly predicted by LE variables.
3. We hypothesize that individual variables are better predictor of academic achievements as measured in grades comparing to LE variables.

3.2. Method

3.2.1. Participants and data collection
Participants comprised 189 university students enrolled in a mid-sized university in Norway. The participants were all currently taking courses in studies for early childhood education in the department of education. Although year of study varied, all participants had previously completed at least one semester of study. Data were collected using a self-report questionnaire. A lecturer managed the survey and students were asked to complete the questionnaire prior to mandatory lectures. All participants received oral and written instructions on how to complete the questionnaire and how the collected information would be used. In the cover letter, we asked participants to report their student number which is a reference number that is not available directly to non-administrative staff (including the researchers in this study). At the end of the semester (approximately 4 months after data collection), we gave the list of student numbers to the administrative office responsible for coordinating examinations at the university. This office provided us with the student's grades, securing the anonymity of the participants. In addition, the procedure was approved by the university and the Norwegian Social Science Data Services.

The average age of participants was 22.6 years (SD 3.8) and 86% were women. The large percent of female participants reflects the higher levels of university enrollment among women in the early childhood education.

3.2.2. Instruments used to measure individual variables
All instruments used in the present study, unless specified in text, used a 7-point response scale ranging from (1) completely disagree/not at all true to (7) completely agree/very true, and added into a composite scale.

Action planning (Luszczynska & Scwarzer, 2003) was measured with four items using the following statements: I have made plans about: "how to get good grades in the current term", "when to study for exams in the current term", "where to study for exams in the current term", and "what to do when tempting situations arise that distract me from getting good grades in the current term". Cronbach's alpha was .90.

Academic self-efficacy (Roeser, Midgley, & Urdan, 1996) was measured with six items assessing whether students believe they could master the academic material and skills, if they were provided

sufficient time and exerted sufficient effort. An item example follows: "If I have enough time, I can do a good job on all my schoolwork". Cronbach's alpha was .87.

Invested efforts were measured with a single item assessing the total number of hours students spend working with studies during one typical week. The item specified that work with studies included lectures, groupwork, student-initiated colloquies, and studying alone.

HSA was measured with four items assessing the degree of established habit students have when it comes to attending lectures. The items were adapted from self-report habit index (Verplanken & Orbell, 2003). An example item follows: "I attend lectures automatically". Cronbach's alpha was .88.

Nonmandatory school attendance (NMSA) was measured with a single item. The following item was used: "How often do you usually attend lectures which are not mandatory".

Grade intentions were measured with a single item: "During the current term I intend to get the following grade". The students were given the option to state their intentions for up to two distinct exams. The Norwegian system of grading in higher education is a letter-grade system ranging from F (F = 1, non-passing) to A (A = 6, highest possible), including the grade of E, which is sometimes absent from the A–F scale used in other countries. These letters were converted to a point system (1–6), respectively. The scores of two distinct exams were added into a composite scale to represent the concept of intention to get certain grades ($r = .71$).

Intention to quit studying current courses was measured with two items: "I have often contemplated to quit studying to be a kindergarten teacher", and "I could currently think of quitting studying if I had a chance to do something else" ($r = .72$).

3.2.3. Instruments used to measure LE variables

Occupational socialization was measured with five items assessing the degree of students` connection to other members of the same profession. The five items were adapted from professional identity scale (see Adams et al., 2006). An item example follows: "I can identify positively with members of the kindergarten teaching profession"; "I am happy to belong to this profession kindergarten teachers". Cronbach's alpha was .85.

Class socialization was measured with five items assessing the degree of student's connection to other fellow students attending the same class. The five items were adapted from team identification scale (Boen, Vanbeselaere, Pandelaere, Schutters, & Rowe, 2008). An item example follows: "I identify myself strongly with my early childhood education class"; "To be a student in this early childhood education class is very important to me". Cronbach's alpha was .95.

The organizational citizenship behavior (OCB) was measured with 13 items assessing students' perception of citizenship behavior in the class (Podsakoff et al., 1997). The scale assessed three types of OCB. *Helping climate* was assessed with seven items reflecting general voluntary behavior to help other students with a school-relevant tasks. An item example follows: "Students in my class help other students if they fall behind in his or her schoolwork". *Civic virtue* was assessed with three items reflecting responsive and constructive involvement in the class. An item example follows: "Students in my class provide constructive suggestions about how other fellow students can improve learning in class". *Sportsmanship* was assessed with three reversed items reflecting student willingness to tolerate less-than-ideal circumstances without complaining. An item example follows: "Always focus on what is wrong with our situation, rather than the positive side". Cronbach's alphas were .89, .78, and .75, respectively.

Perceived justice and support was measured with six items assessing the working climate in which teachers provide support, help, and fairness for students (Roberts & Clifton, 1992). An item example follows: "Teachers in this class are just and impartial". Cronbach's alpha was 89.

Mastery learning orientation was measured with five items assessing stimulating learning context that promotes intrinsic motivation and focus on personal development. An item example follows: "Teachers in this class believe that all students can learn and improve". Cronbach's alpha was .77.

3.3. Dependent variable: Student grades
Actual behavior (actual student grades) was assessed by obtaining registered exam results

directly from the university office of student records as described previously. Thus, we report students' actual grades in contrast to mere intentions or self-estimates of prospective grades, as seems to be rather common practice in contemporary research (see meta-analysis: Kuncel, Crede, & Thomas, 2005). The conversion of grades to a numeric scale was identical to the procedure used in the calculation of grade intentions. The results were added into a sum score to represent academic achievements as measured in grades. The correlation between items was .49.

3.4. Results
Descriptive statistics (means, standard deviations, and correlations) for individual variables are provided in Table 1, with the dependent variable (i.e. grades) listed on the top. Actual grades correlated moderately but significantly with most included individual variables. The range of correlations varied from .25 (Invested effort) to .35 (NMSA and Intentions to quit). The measure of planning correlated with all included variables, reflecting thus the cluster of self-regulatory processes typically required to obtain higher grades. As expected, HSA and NMSA correlated strongly and significantly ($r = .76$) indicating the conceptual overlap between habitual and NMSA.

Descriptive statistics (means, standard deviations, and correlations) for LE variables are provided in Table 2 with the dependent variable (i.e. grades) listed on the top. An unexpected finding was that actual grades were not significantly correlated with any of the included LE variables. The range of correlations varied from −.06 (OCB Sportsmanship) to .14 (Occupational socialization). As expected the correlation between LE variables were considerable indicating convergent validity, i.e. that included measures tend to assess the overarching process of supportive LE. For example, the measure of Learning orientation was moderately to strongly correlated with perceived justice ($r = .48$), Civic virtue and Class socialization strongly with Helping climate ($r = .66$ and $r = .63$). The existence of relatively strong correlations between LE measures provides support for convergent validity of the LE instruments in the study.

3.5. Predicting grades from individual variables
Table 3 shows the hierarchical regression analysis in which actual grades were regressed on planning in the first step, invested efforts and self-efficacy in the second step, HSA in the third step, NMSA in the fourth step, and intentions (to get grade and to quit) in the fifth step. In the first step, the measure of action planning emerged as significant predictor ($\beta = .27$, $p < .01$) and accounted for .07% of the variance in actual grade scores. In the second step, the effects of invested effort and self-efficacy were significant ($\beta = .18$, $p < .05$; $\beta = .27$, $p < .01$) increasing explained variance to .15%, while the effects of planning were reduced to nonsignificant level. In the third step, HSA ($\beta = .22$, $p < .01$) added .04% to explained variance and together with self-efficacy exhibit significant effects on grade scores. The inclusion of NMSA at the forth step increased explained variance to .23% ($\beta = .33$, $p < .001$), while the effects of HSA were reduced to nonsignificant level. In the final regression equation at step five, the measures of intentions to get grade and intentions to quit were added to the equation. At this point, the predictors under consideration was able to explain 30% of the variance in actual grades, with self-efficacy ($\beta = .16$, $p < .01$), NMSA ($\beta = .25$, $p < .01$), intentions to get grades ($\beta = .19$, $p < .05$), and intentions to quit ($\beta = .23$, $p < .01$) as the only significant independent predictors.

The use of hierarchical linear regression typically includes detection of the possible mediating effects. Of interest in this case is the relation between HSA and NMSA. Thus, although not initially hypothesized, the reduction in HSA, after the inclusion of NMSA in the fourth step, invited us to check

Table 1. Correlations and descriptive statistics among individual variables (N = 189)

Variables	1	2	3	4	5	6	7	8
1. Actual grades	-	.26**	.28***	.25**	.31***	.35***	.27***	.35***
2. Planning		-	.25**	.38***	.28***	.27***	.24**	.29***
3. Self-efficacy			-	.09	.18*	.11	.36***	.27***
4. Invested effort				-	.22**	.30***	.03	.20**
5. HSA					-	.76***	.07	.17*
6. NMSA						-	.06	.24**
7. Intention grade							-	.16*
8. Intention to quit								-
Mean	3.32	4.18	3.91	21.01	5.29	5.63	4.10	3.99
SD	1.18	1.35	.77	7.62	1.48	1.29	.72	1.24

*p < .05; **p < .01; ***p < .001. HSA = Habitual school attendance; NMSA = Nonmandatory school attendance.

Table 2. Correlations and descriptive statistics among LE variables (*N* = 189)

Variables	1	2	3	4	5	6	7	8
1. Actual grades	-	.00	.14	-.06	.06	.06	.00	.00
2. Class socialization		-	.38***	-.20**	.41***	.63***	.23**	.32***
3. Occupational social.			-	-.04	.23**	.19*	.15	.41***
4. OCB Sportsmanship				-	-.12	-.28**	-.03	-.05
5. OCB Civic virtue					-	.66***	.07	.22**
6. OCB Helping climate						-	.22*	.22*
7. Justice							-	.48***
8. Learning orientation								-
Mean	3.32	5.34	3.86	2.62	4.91	4.95	3.85	3.80
SD	1.18	1.49	.76	1.13	1.12	.78	.69	.54

*p < .05; **p < .01; ***p < .001.

for a possible mediational effect between these variables. According to Baron and Kenny (1986), the confirmation of mediation effects is demonstrated when a mediating variable accounts for a relationship between two other variables such that the effects of predictor variables are significantly reduced when a hypothesized mediating variable is included in the regression analysis. Table 3 shows that the reduction of β values in the third step, after the measures of NMSA was included, was substantial for HSA. To test that this reduction was statistically significant, a Sobel tests was conducted. The results show that mediational effects of NMSA on the relation between HSA and actual grades were significant ($z = 2.91$, $p < .01$).

3.6. Predicting grades from *LE* variables

Table 4 shows the hierarchical regression analysis in which actual grades were regressed on class identity and occupational identity in the first step, OCB components (sportsmanship, civic virtue, and helping climate) in the second step perceived justice and learning climate in the third step. The simplified presentation of regression analysis concerning predicting grades from LE variables shows that combined effect of environmental variables in the present study is virtually non-existent. This finding is also supported by the correlational analysis (Table 2) that shows that there exist no statistically significant association between actual grades and measures of identity. In sum, Table 4 shows that included variables in the final regression equation at step 4 explain .00% of variance in actual grades.

3.7. Additional explorative analysis

Although not initially contemplated, somewhat surprising result showing no relation between LE variables and academic achievements prompt us to explore this issue further. Table 5 shows

Table 3. Regressing actual grades on individual variables: planning at step 1, invested effort and self-efficacy at step 2, HSA at step 3, NMSA at step 4, and intentions to get grade and intentions to quit at step 5

Steps	Predictors entered	Adj. R^2	F_{change}	Beta
1	Planning	.07	11.76***	.27**
2	Planning	.15	9.96***	.12ns
	Invested effort			.18*
	Self-efficacy			.27**
3	Planning	.19	9.96***	.07ns
	Invested effort			.15ns
	Self-efficacy			.25**
	HSA			.22**
4	Planning	23	10.09***	.06ns
	Invested effort			.10ns
	Self-efficacy			.26**
	HSA			.00ns
	NMSA			.33***
5	Planning	.30	10.53***	−.02ns
	Invested effort			.10ns
	Self-efficacy			.16*
	HAS			.04ns
	NMSA			.25**
	Intentions grade			.19*
	Intentions to quit			.23**

*$p < .05$; **$p < .01$; ***$p < .001$, ns = non-significant. HSA = Habitual school attendance; NMSA = Nonmandatory school attendance.

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Table 4. Regressing actual grades on LE variables: class and occupational socialization at step 1, OCB components at step 2, and justice and learning orientation at step 3

Steps	Predictors entered	Adj. R^2	F_{change}	Beta
1	Class socialization	.00	1.31ns	−.07ns
	Occupational social.			.20**
2	Class socialization	.02	1.30ns	−.22**
	Occupational social.			.21**
	OCB Sportsmanship			−.08ns
	OCB Civic virtue			.10ns
	OCB Helping climate			.14ns
3	Class socialization	.00	.93ns	−.20**
	Occupational social.			.23**
	OCB Sportsmanship			−.07ns
	OCB Civic virtue			.11ns
	OCB Helping climate			.14ns
	Justice			−.02ns
	Learning orientation			−.04ns

*p < .05; **p < .01; ***p < .001; ns = non-significant.

Table 5. Correlations between selected individual and LE variables

	HSA	Intention to quit	Self-efficacy
Learning orientation	.29***	−.20**	.37***
Occupational social.	.23**	.23**	.44***
Perceived justice	.32***	.30**	.20*

HSA = Habitual school attendance. *p* Values: *p < .05; **p < .01; ***p < .001.

significant moderate bivariate relation between selected individual and LE variables. This relation shows that LE variables, although not related directly to academic achievements, are nevertheless important in the sense that they are statistically associated with central individual variables. Thus, the existing association between individual and LE variables indicates the possibility that LE conditions influence academic achievements indirectly through the workings of the variety of individual processes.

4. Discussion

The goal of the present study was to examine the relative impact of individual and LE variables on academic achievements as measured in grades in the context of higher education. The amount of the explained variance could be considered as satisfactory but also modest ($R^2 = 30$). On the other side, such modest amount of explained variance is acceptable considering that assessment of grades was registered (1) approximately four months after T1, and (2) using objective measure of grades which is both theoretically and in terms of measurement dissimilar from the existing measures in the study. It is commonly known that considerable time intervals between measurement points might influence the strength of the association between T1 and T2 variables (Ajzen, 1991). Indeed, the results from a meta-analysis of prospective prediction of health-related behaviors showed that behaviors assessed on a short-term perspective were better predicted than those assessed on a long-term perspective (McEachan, Conner, Taylor, & Lawton, 2011).

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The general findings support the study`s hypothesis 1. As initially hypostatized, achievements as measured in grades were significantly predicted by individual variables with NMSA, self-efficacy, and behavioral intentions as the strongest predictors. The significant influence of these variables on student grades was hardly a surprise, taking into consideration mounting evidence showing the importance of students' school attendance, self-efficacy, and behavioral intentions for academic achievements (Credé et al., 2010; Lin & Chen, 2006; Moore et al., 2003). The specific contribution of the present study is the inclusion of the measure of NMSA. Indeed, the present analysis suggests that the effects of HSA on student grades were mediated by NMSA. This once again underlines the association between intrinsic motivation and human action in general (Milyavskaya & Koestner, 2011), and academic achievements in specific (Garon-Carrier et al., 2016). More specifically, the present findings indicate that academic achievements are associated with intrinsic motivation to attend school lectures and other school-related activities.

The second specific contribution of the present study is the lack of support for hypothesis 2, which stated that LE variables should also be significantly associated with academic achievements. Although we expected, as stated in hypothesis 3, that aggregated effects of individual variables would be stronger comparing to LE variables, the present data display somewhat disturbing results of virtually non-existing relation between LE variables and grades. As noted in introduction, the inclusion of contextual variables in prediction of grades is highly warranted based on the previous research (e.g. Eccles et al., 1998; Maehr & Anderman, 1993). However, other researchers have also pointed out that how various aspects of the school environment affect student grades still remains unclear (Wang & Holcombe, 2010). The present results support this suggestion. Indeed, presented ad hoc analysis exploring associations between important individual and LE variables indicates that contextual aspects, although yielding no direct effect on academic results, are nevertheless significantly associated with individual processes. This indicated the existence of the important yet indirect association between LE and grades, which is probably mediated by the workings of the individually based behavior or characteristics. Considering the assumed efforts of many educational institutions to improve LE conditions for their students, future studies should, in more detailed manner, address the nature of association between LE variables and academic achievements assessed by objective measures.

4.1. Limitations and implications

The present study has some limitations that should be acknowledged. First, the relatively small and uniform sample size (i.e. early childhood education students) calls for caution regarding the generalizability of results. Future studies should overcome this limitation and aim to include larger and different samples to provide further support for the present findings. Second, the role of possible measurement bias should be explicitly mentioned considering the somewhat surprising lack of associations between LE and academic achievements. Thus, it is common to be especially attentive to measurement issues in the situations where unexpected results are obtained. More directly, the lack of effects of LE on grades in the present study might be grounded in bad instruments. However, as reported in introduction and method section, the majority of instruments used in the present study such as action planning, academic self-efficacy, HSA, grade intentions, OCB, and actual grades are (1) extensively and repeatedly used in current literature as indicated in the method section, and (2) frequently used in Norwegian context (e.g. Høigaard, Kovač, Haugen, Mathisen, & Øverby, 2015; Kovač et al., 2016). In addition to satisfactory and high alpha values in terms of reliability, the exploratory descriptive analysis also shows medium-to-high intercorrelation among LE variables, providing further support for convergent validity of used measures. Hence, the lack of correlations between dependent variable (i.e. grades) and LE measures cannot easily be ascribed to unreliable instruments. And finally, the knowledge gathered in present study would be more comprehensive if several additional measurement points were included between T1 and T2. Although this kind of design is without doubt more requiring, the additional measurements would be able to capture fluctuations and/or stability of important motivational, self-regulatory, and affective processes. This would provide an insight on how decision process alters over time

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as one is approaching a decision point, or a point of no return (i.e. getting grades). In addition, such approach would also be better suited to explore potential mediators between independent variables and academic achievement.

Notwithstanding these limitations, the present analysis has several theoretical, practical, and methodological implications. With respect to theory, the present results underline the primacy of personal or individual attributes over the processes that shape LE. Although this might represent somewhat disturbing finding, considering the assumed efforts that each educational setting is placing on their learning surroundings, this also represents a critical issue that should be further explored and validated in future studies. Furthermore, the study offers a preliminary analysis of nuances between mandatory and NMSA, illuminating the need for more detailed knowledge concerning the relation between superficially similar behavioral processes. In terms of practical implications, the results also underline the importance of school attendance in the prediction of academic achievement (Credé et al., 2010). Instead of providing and spreading a mere normative argument for student attendance (i.e. you should be present in classes), one could "advertise" the repeated finding that attendance, especially attendance that is based on internal motivation, improves academic achievements. And finally, in terms of methodology, the study yet again (Kovač et al., 2016) encourages the use of objective measures (i.e. students' actual grades) over mere estimates or retrospective reports of prospective grades, as commonly used in many studies (Kuncel et al., 2005). Furthermore, the use of scales that are not always formatted uniformly as principle of correspondence or compatibility suggests might be advised (Ajzen & Fishbein, 1977) with the aim to reduce "blown up effects". For instance, habitual and school attendance emerged as a significant predictor of grades in the present study even though items in the scales are not specifically related to grades.

4.2. Conclusions

The current study demonstrates that individual or dispositional variables are better predictors of academic achievements compared to LE processes. Furthermore, it was also found that LE processes are not directly associated with grades. Nevertheless, the results of additional descriptive analysis suggest possible indirect route in which stimulating LE might indeed be associated with achievements. Overall, the present findings show that there exists complex interplay between various independent variables, ranging from individual dispositions to environmental considerations. This suggests that effects of LE, or any other variable for that matter, should not be taken for granted when objective measures of criterion variable (i.e. actual achieved grades) are employed.

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