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Student Involvement and Learning Outcome in Professional Education in Norway

Abstract

The main purpose of this paper is to test how learning outcome among students in professional education is affected by the background of the students or characteristics of the learning environment of the institution. The analyses are based on a survey among students in their final year of professional education. The effects of students' family background are very weak. This is surprising, since school marks, which usually explain a considerable part of study results, are strongly correlating with family background. The study effort, measured by average study hours per week explains very little, but interactive and autonomous study strategies seem to lead to positive learning outcomes. Also teaching quality and social climate have an impact on learning outcome.

Introduction

The aim of this paper is to examine the impact of social background and study strategies on learning outcome among students in professional education. The topic addressed by the paper is one of general interest in education, psychology and educational sociology, but its starting point is local.

In Norwegian higher education a reform, *The Quality Reform*, has been implemented. It is both structural and pedagogical. Important changes are:

- a degree reform according to the Bologna declaration,
- increased focus on teaching and the supervision of students, and
- changes in the assessment system away from final examinations towards coursework and portfolio assessment.

A core aim is to improve the quality and efficiency in higher education, and the goal is formulated that “students should succeed in their studies”. One of the main agendas for Norwegian higher education, as in many other countries, is that students are expected to work more and better, and the institutions are expected to implement structures and practices that work to reach these aims.

There are some basic assumptions underlying reforms in higher education. One is that there are some ways of studying that are of higher quality than other ways of studying. Institutional changes are expected to result in improved practice. Reforms are based on some assumptions about what makes a difference. But how certain are we about the outcomes of the changes that are implemented? Are there good reasons for the educational optimism that educational reforms are based on? How do the students learn? Are the resources for

learning inside or outside of the higher education institutions? Are they internal or external to the didactic structure of the higher education institutions? There are different views on these questions. Among researchers different perspectives and disciplinary orientation create different views on the same issues. In this paper we will particularly look at the impact of background and contextual variables and the role of agency on study behaviour and finally on learning outcome. The approach has similarities with Biggs' (1989, 1993) model of classroom learning with presage, process and product as core components. Our model is different particularly in that it addresses social background and gender rather than students preparedness for studying as individual traits.

The study is based on survey data from Oslo University College, the largest institution for professional education in fields like teacher training, social work, health sciences and engineering.

What makes a difference?

Sociology – societal reproduction

One view, mainly based on sociological theory is that the most influential sources for student learning are external to the educational context. Education tends to reproduce inequality and maintain existing social structures in society, and the individual students' preferences are related to the social class he/she comes from. Some students face cultural barriers, unfamiliar values etc. when they enter higher education and will have more problems succeeding than others (Boudon 1974, Bourdieu and Passeron 1992). To explain how the social reproduction takes its form within education, sociological reproduction theories can be combined with *typological* psychological theories that focus on individual differences that students bring into higher education. Students act in congruence with their social background and with results accordingly. Social patterns manifest themselves in individuals as relative permanent personality traits resulting in preferences that are socio-culturally derived. From such perspectives we can expect students from higher social classes to be more involved and to value learning activities that goes beyond the minimum requirements higher than students with another social background.

On the other hand, new sociological theories tend to have less emphasis on the significance of social background and stress that young people are concerned about realising themselves and their own potentials (Maccoby 1989, Inglehart 1990). Focusing on future opportunities might compensate for the impact of socio-cultural background on student behaviour.

Pedagogy – facilitating learning

From a pedagogical or educational perspective, the different aspects of the educational setting and the pedagogical programme are attributed significance, rather than factors external to the institutional context. The point is to identify mechanisms within the educational context that support learning. Among educational perspectives we find a broad spectrum of such contextual dimensions that can facilitate student learning.

One approach has *transmission of knowledge* in focus and emphasises learning as a result of instruction and the aligning of the components of the learning material, skills and competences.

Another approach focuses on *the individual student* as an active agent. Students' conceptions of learning, their approaches to learning, and their learning strategies are viewed as primary mechanisms influencing the outcome of higher education. Learning is construction of knowledge based on the relationship between previous knowledge and skills. The activity of the individual is crucial for learning. Reviewing nearly 3000 studies on the effect of university on students, Pascarella and Terenzini (1991 p. 610-611) concludes that

..the most inescapable and unequivocal conclusions we can make is that the impact of college is largely determined by the individuals' quality of effort and level of involvement in both academic and non-academic activities.

Such a conclusion suggests that the impact of college is not simply the result of what a college does for or to a student. Rather, the impact is a result of the extent to which an individual student exploits the people, programs, facilities, opportunities, and experiences that the college makes available. [...] it is the individual student who perhaps most determines the extent to which college makes a difference.

Learning and agency

The current state of affairs in the area of research on student learning in pedagogical perspective is that the focus particularly is on the significance of the *learning practices* of individual agents in solitude or in collaboration with teachers and peer students. The emphasis is on the opportunities that students have to influence their own learning and how students appropriate them. But there is also an expansion from individually oriented approaches toward the more socially oriented ones. Biggs (1993) systemic approach integrates students' activities with the activities of teachers as well as cultural and structural aspect of education. This does not represent a move back to learning being dependent of external factors. It is rather a move from learning as an independent and individual process, to learning as an *interdependent* and social process.

There are different views on the character of agency in learning. It can be attributed to the individual agent or viewed as an aspect of the relationship between the agent and his or her ambient environment. Winne (1995) argues for intensifying research on learning processes when students study mainly by themselves in chosen or forced solitude. «Learners should develop and have the will to exercise effective means for self-directing their learning...» Winne (ibid., p. 174). Vincent Tinto (1997), on the other hand, conceptualises colleges as communities of learners and emphasises that for most students, learning is enhanced when they find themselves in learning settings which require them to share the experience of learning and become connected learners.

Across the different views on agency and about the impact of individual work and interaction on learning, there is general agreement about the significance of student involvement.

Analytical approaches

This study takes an inter-paradigmatic approach. Its starting point is a continuum of factors to which researchers attribute influence on students' learning. In one end of the continuum we find a mainly *structuralist approach* focusing on how wider social structures underlie individual students' learning and socialisation. In this perspective, embedded in a mainly

sociological research paradigm but linked to a psychological individualistic paradigm, the individual, and even the educational system, has little real influence on the students' development. Education sustains social reproduction.

Against this rather deterministic approach there is a scope of approaches that are more clearly pedagogically grounded. On the one hand we have the *transmission* or *teaching-learning approach* that attributes influence to the didactic programme and to teachers and teaching (Tyler 1950). The quality of the teaching and the didactic structures – or, more generally characteristics of the institutional context – determines student learning practice and outcome.

Student agency in learning can be seen as the counter piece of instruction and predetermined social structures. But there is a diversity of notions of agency. The individual approach particularly focuses on the influence of the individual learner and his or her way of meeting the task of learning (Winne 1995, Bandura 1986, Zimmerman, 1990). Others emphasise social interaction and cultural integration in communities of learners as basis for learning and attribute learning to the learning cultures in the ambient educational context, rather than to the individual as solitary actor (Tinto 1997, Lave and Wenger 1991, Engeström 1987, Säljö 2001). Peer-student interaction is highly regarded. This latter position focuses on learning as contextually situated practice. Agency is viewed as much as a response to what the educational context affords or demands as attributes of the individual. To understand human practice we have to study the context of action and interaction.

Taking an inter-paradigmatic position this study tries to investigate the relevance of various explanatory models. What impacts on student learning? We do not intend to answer this question in depth. Our main intention is to question the assumptions underlying educational reforms that we raised earlier.

Data and method

The paper is based on “StudData”, a panel survey following student cohorts from entering higher education to 2 and 4 years after graduation. The present data set is based on those who completed their studies in spring 2001. The data was collected at the end of the students' final term, before their final exams. The data covers all professional programmes at this institution, some other state university colleges, and medical students at the University of Oslo. 3067 questionnaires were distributed, and the total response rate was 70, varying between 61 and 95 percent between programmes.

Data was distributed to, and completed by, students during their lectures. This means that students who do not attend classes regularly are underrepresented. So far, the analyses based on this dataset, support our impression that there are not serious biases and that the representativeness could be considered satisfactory.

Clarification of variables

Background variables are of two kinds: gender and parents' education. *Structural variables* are the specific educational (professional) programme, as set of six items measuring the teaching quality and two items measuring the social climate among the students. *Study behaviour* is defined through a factory analysis based on a set of questions about how students approach their studies.

One of our main challenges has been how to measure *learning outcomes*. Our survey data do not contain any examination marks or other “objective” measures. However, information about marks would probably not have helped us much, both since many modules of professional programmes are rated only as “passed” or “not passed”, and since the assessment system and grading practice may vary considerable between programmes. We rely on the students’ own self-reporting, and look for process indicators which may represent relevant measurements of student gains. Kuh, Pace and Vesper (1997) have assessed indicators to estimate student gains associated with good practice in undergraduate education, and their findings are particularly relevant for our paper. They conclude that students’ assessment of experienced gain, or learning outcome, is a valid measure of academic achievement. Cassedy and Eachus (2000, p. 319) similarly found “self-reported proficiency within an academic field to be a positive predictor of academic achievement within that field”. Another aspect is that low-achieving students tend to overestimate their achievement. High-achieving students, on the other hand, tend to underestimate their achievements (Boud and Falchikov 1989, Mowl and Pain 1995, Orsmorn *et.al.* 1997, Dochy *et.al.* 1999).

Learning outcome is measured by student’s assessment along a five point scale of what competencies they have gained from their study on 18 items:

- Broad, general knowledge
- Profession-specific knowledge
- Knowledge about planning and organisation
- Understanding on rules and regulations
- Ability to critically reflect and asses own work
- Ability to work under pressure
- Practical skills
- Ability to work independent
- Ability to collaborate
- Ability to take initiatives
- Personal engagement
- Oral communication skills
- Written communication skills
- Tolerance, ability to value others’ opinions
- Ability of leadership
- Ability take responsibility and to make decisions
- Ethical skills
- Empathy

These items differ somewhat from the instruments developed by Kuh and Pace, the College Student Experience Questionnaire (CSEQ), but the principle is the same.

The items were selected from a larger battery implemented by a large European study on the transition from higher education to work. The items are specially aimed at measuring both competencies that are valued in the work context and in education.

Results

According to our analytical approach, we will present the results in a stepwise way. We will shortly describe findings concerning students' study effort. Next, we will try to identify the dimensions of study strategies and how study strategies are affected by background factors, contextual factors and study effort, and finally, we will analyse how individual background, contextual factors, study effort and study strategies affect learning outcome.

Study effort

Previous studies (Wiers-Jensen & Aamodt 2002, Aamodt 2003) found that the average number of hours studied per week was about 30. Also in the present data the average numbers of study hours is about 30 per week.

Study strategies

Study strategy could be defined in several ways, either as a one-dimensional index, or along different aspects or components. In the questionnaire, the students were asked if they agreed or not on a set of 9 statements concerning their way of studying. The responses were given on a 7-point Likert scale. Based on the responses to these statements, we have conducted a factor analysis to identify the dimensions of study behaviour, and from the results of the factor analysis we have constructed indexes to measure these dimensions.

Table 1: Study strategies: Factor analysis. (principal components, varimax)

		Factor 1	Factor 2	Factor 3	Communality
1	I try to take a critical attitude towards my subject	0,07	0,07	0,66	0,45
2	I prepare before classes	-0,18	0,16	0,56	0,37
3	I am usually present on campus only during classes	0,58	-0,32	0,36	0,57
4	I find it useful to discuss with other students	0,07	0,70	0,18	0,52
5	I raise questions to teachers about my study	-0,08	0,56	0,21	0,36
6	My studying is predominantly doing obligatory work	0,77	-0,05	-0,12	0,62
7	I prioritise what is expected of me at exams	0,74	0,05	-0,30	0,64
8	I often participate in student-initiated group work	-0,13	0,75	-0,08	0,58
9	I often read subject-matter that is not part of the syllabus	-0,39	0,11	0,59	0,51
	Eigenvalue	2,22	1,25	1,15	
	Accumulated explained variance	18,1	35,5	51,3	

The three highest factor loadings on each factor are marked in bold.

The first factor identified has the three highest loadings on the statements 3, 6 and 7. We have described this study strategy as *minimalist*, in the sense that students do what they think is expected from them and not more. The notion of a minimalist strategy probably covers two meanings. One refers to time spent on studies; students spend the minimum time they think needed to reach their goals. The other refers to the tendency to focus only on the content that is minimally required by the system, e.g. problems, literature, exercises and assignments. Data that we are not including here also document that students with relatively low study effort tend to fall into the minimalist group. The second factor has the highest loadings on statements 4, 5 and 8. We have named this factor *interactive*, in the sense that it characterises a “social” study strategy where students participate actively in the learning

environment, collaborate with other students and interact with teachers. The third factor has high factor loadings on these items 1, 2 and 9. We have named this study behaviour *autonomous*, indicating that these students have an independent strategy and have preferences for working individually.

At this stage, we have not made any assessment on whether these three study strategies are “good” or “bad”. In principle, at least at this stage in the analysis, all strategies may be favourable for achieving positive learning outcome. But the minimalist strategy can be seen as being in contrast to high quality learning, which is often associated with independent learning, involvement in learning activities, “deep” learning and critical thinking.

Table 2 shows that the autonomous study strategy appears less often than the interactive or minimalist study strategy.

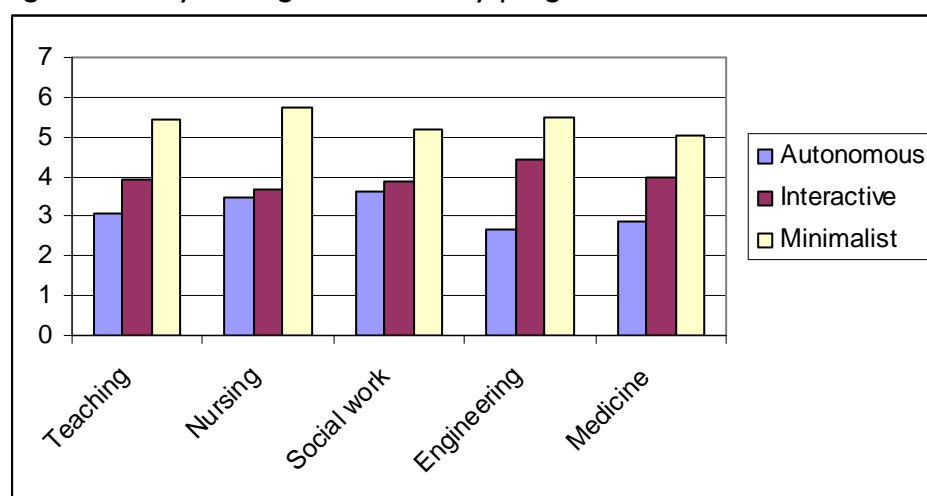
Table 2: Mean scores on study strategies

	Mean	Standard deviation	N
Minimalist	4,69	1,48	2383
Interactive	4,49	1,28	2381
Autonomous	3,90	1,16	2384

Female students had a slightly more interactive study strategy than men, and that there were no gender differences on autonomous behaviour. Female students also reported a significantly stronger score on minimalist study strategy. Students with parents having higher education had less minimalist study strategy, and a slightly stronger interactive strategy, while we found no effect of social background on autonomous study strategy.

The differences between study programmes are visualised in Figure 1 for five programmes: teacher education, nursing, social work, engineering and medicine.

Figure 1: Study strategies in five study programmes. ¹



¹ Estimated by linear regression

The profiles follow the same pattern across programmes, but nursing students had stronger predominant minimalist study behaviour than students in teacher education, social work and medicine. There were no significant difference between nursing and engineering. Engineering and medicine scored lowest on autonomous strategy, while an interactive strategy is most visible among engineering students. One explanation of the latter result could be that engineering students spending much time in laboratories being guided by instructors and discussing with other students and they are often involved in project work.

Medicine is a university study, highly research-based and one of the most selective and prestigious study programmes and it is the only postgraduate students included in the survey. We could, therefore, expect medical students to show less minimalist and a stronger autonomous study strategy than state college students. This assumption is not supported by the results. If the autonomous-minimalist dimension characterises degree of 'academic' study behaviour, medicine, according to this criteria, is not significantly more academic than the state college programmes.

Learning outcome

How is students' learning outcome affected by (1) background factors, (2) the study context, (3) study effort and (4) study strategies? Table 3 shows the result and an analysis of learning outcome in relation to

- background variables (gender and parents' education),
- contextual variables (teaching quality and social climate), and
- study behaviour (study effort and study strategy).

Table 3: Effects on learning outcome. Results of linear regression analysis.

	B	Std. Error
(Constant)	2,454	0,091
Gender (females= ref.)	-0,207	0,024
Parents education (ref= only basic school)		
Upper secondary level	-0,017	0,029
Higher education < 5 years	-0,023	0,029
Higher education 5+	-0,062	0,035
Study hours per week	0,002	0,001
Study behaviour:		
Minimalist	-0,016	0,008
Interactive	0,044	0,009
Autonomous	0,049	0,010
Teaching quality	0,118	0,010
Social climate among students	0,063	0,008
Adjusted R2:	.188	

Male students report lower learning outcome than females. But we found no effect of parents' education. This is surprising, especially since there is a quite strong interrelation between social background and previous school achievement. In our data, we do not have information about school marks from secondary education, but Aamodt (2004) in a study

based on another set of StudData found that neither school marks nor parents' education had any effect on learning outcome, as it is operationalised here.

The impact study strategy is more important than the impact of study effort. There is a significant, but rather small positive effect on learning outcome of study effort. There is a slightly negative effect of minimalist study strategy, and positive effects of both interactive and autonomous.

Both students' evaluation of the quality of teaching, as well as the social climate, has positive effects, and particularly teaching quality seems to be important.

In the next analysis, we want to compare whether the effects of study behaviour on learning outcome vary between study programmes. For these analyses, we have only included the largest programmes: teacher education, nursing, social work, engineering and medicine.

Since the number of observations for each study programme is rather small, we expect to "loose" some of the significant effects that we had in our analysis for all programmes together.

Table 4: Programme-specific effects on learning outcome. Results of five separate linear regression analyses

	Teacher education	Nursing	Social work	Engineering	Medicine
(Constant)	2,306	2,849	2,112	1,806	1,633
Gender	-0,144	-0,078	-0,144	-0,018	-0,056
Parents education (ref= only basic school)					
Upper secondary level	0,102	-0,077	0,049	-0,042	-0,201
Higher education < 5 years	0,062	-0,095	0,045	0,106	-0,252
Higher education 5+	-0,056	-0,005	0,169	0,115	-0,241
Study hours per week	-0,001	0,002	0,006	0,001	0,006
Study behaviour:					
Minimalist	-0,002	-0,013	0,005	0,041	-0,025
Interactive	0,061	0,025	0,044	0,120	0,069
Autonomous	0,040	0,020	0,034	0,027	-0,018
Teaching quality	0,095	0,137	0,134	0,152	0,210
Social climate among students	0,091	0,026	0,079	-0,012	0,134
R2 adjusted	0.165	0.082	0.197	0.179	0.275

In these separate analyses, we find a negative learning outcome among male students compared to female students in teacher education. There are still no relationship between social background and learning outcome in our sample.

The effect of study effort is only persisting in social work and medicine, and there is no effect of a minimalist study strategy in any study programme. In engineering, which had the most interactive study strategy, this strategy also seems to have the strongest effect, an effect also found among students in teacher education. An autonomous study strategy had a slight effect only in teacher education.

Students' assessment of teaching quality has an important effect on learning outcome in all study programmes, while social climate had an effect in teacher education, social work and medicine, but not in nursing and engineering.

Our general impression is that there are some significant differences in how learning outcome is affected by the various variables in our models. Nursing deviates from the other study programmes by being affected only by teaching quality, no other factors. The explained variance is also much lower in nursing, which means that our analytical model explains less, and other unobserved factors more, among nursing students than the other programmes.

Discussion

In this paper we have tried to answer a series of questions concerning student involvement and learning outcome in professional education. Our primary intention was to investigate the explanatory power of a background variable against context variables and agency in learning.

Social background

Most striking is the results regarding the connection between social background and learning outcome. Earlier research has shown that there is a rather strong correlation between social background and school marks in upper secondary education, and also between school marks and learning outcome. Our data do not contain school marks, but we expected to find an effect of parents' education on learning outcome. We did not find any effect at all, which is quite surprising. This means that the social reproduction theory, which is regarded as important to explain educational preferences and choices, is not valid for explaining learning outcome, at least in professional education. A possible explanation could be that the graduating students have been selected during previous stages in the educational career, or that professional education favours a broader range of qualifications which are less affected by social background than traditional academic achievement.

We did find an impact in that students having parents with higher education are less inclined to study according to a minimalist, and have a slightly more interactive study strategy. To conclude, the effect of social background, as measured by the level of parents' education, is minor.

The background factor that turned out to have explanatory power is gender. Female students report a significantly higher learning outcome than male students. Female students also have higher study effort and a stronger interactive study strategy, but at the same time also a more minimalist study strategy.

College affects

Compared to the effects of individual background, we conclude that the effects of the study context, that is the specific characteristics of study programmes, are more dominant than background variables.

Our findings show that learning outcome, as students report, is significantly affected by the educational programme and the quality of teaching and the social climate. We find both direct effects of the study context (programme and teaching quality) on learning outcome, as

well as indirect effect where the study programme affects the study effort and the study strategies of the students. Another important finding is that the social climate among peers seems to affect the learning outcome. Learning is hence not entirely promoted by the students' interaction with the teachers, but also in collaboration with other students.

We find the most significant differences between educational programmes. There are dramatic differences in how much time students spend on their studies between different programmes, from an average of 44 hour per week in arts and design to less than 27 hours in library. Similarly, there are significant differences between students study strategies in different programmes. We do not know what aspects of the programmes created these differences. Some of the findings are surprising, e.g. that in a "hard fact" programme like engineering, students show preference for an interactive study strategy while students in social work do not. In this respect engineering students differ from students in economics and administration, which also are could be regarded as more "hard facts" programmes.

These results indicate that the structure of the educational programme has impact on how students work and the outcomes of their studies. One of our main finding is that the study context, that is field of study, teaching quality etc., has great impact both on the study behaviour and the learning outcome of students. Students' learning is not predominantly determined by their background. Pedagogical research paradigm seems to have stronger explanatory power than sociological explanations, with few exceptions.

Agency

Agency refers to the impact of study behaviour on learning outcomes. Our study show that study strategy impacts on learning outcome. A minimalist study strategy is combined with lower learning outcome than an interactive and autonomous strategy.

The study documents that interactive and autonomous study strategies are more favourable than a minimalist strategy. These findings support the principle for good teaching and learning discussed by Chickering and Gamson (1987). This is also in line with e.g. Tinto (1987) who emphasises the importance of academic and social integration (both formal and informal) for succeeding in higher education.

In this study it is clear that student agency in learning is an intermediate variable. It impacts on learning outcomes, but it is itself an effect of the educational programme. Different programmes seem to promote different study strategies. But the situation is more complex, because we find more than one strategy to be significant in several programmes. E.g. the two categories *female students* and *engineering students* both have a combination of a minimalist and an interactive strategy. These two strategies might not exclude each other. Minimalism in the meaning of focusing on what is (minimally) required can go together with an interactive strategy. Students can have preference for discussing the (minimally) required. Similarly, the autonomy strategy is not in conflict with an interactive, but we have found no such link in our material. The combination of an autonomous and a minimalist strategy, that we find e.g. in teacher education and in medicine, seems more problematic. While the combinations minimalist/interactive and autonomous/interactive seem possible, the minimalist and the autonomous strategies seem to exclude each other as individual study strategies. But a programme can afford, even actively initiate, strategies that are exclusive to each other by being contradictory in its requirements to students. Another, more friendly,

explanation is that a programme has an open form and open up for, even support, different ways of learning.

Final comments

Coming back to the questions we posed in the beginning, our study gives support to the educational optimism that underlies educational reforms. Changes in the learning context will have impact on students learning practice and the learning outcomes. The main mechanisms influencing the quality of learning are internal to the educational context. The study does not point to what factors internal to the educational programme has impact and what changes should be made to increase the quality of studies. To come to terms with such questions we would need another, and probably more qualitative, research design.

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