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The impact of the university context on European students' learning approaches and learning environment preferences

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Abstract. This article describes experiences of 610 Dutch students and 241 students from other European countries who studied at least three months abroad within the framework of an international exchange program. The Dutch students went to a university in another European country and the foreign students went to a Dutch university. By means of a questionnaire students' perceptions of three main characteristics of the university learning environment were measured concerning the home university, the host university and the ideal learning environment. The students were also asked about their way of learning at the home university and at the host university, in particular about the extent of constructive learning and reproductive learning. Evidence was found for the influence of aspects of the learning environment on the two learning approaches; e.g., a learning environment characterized as student-oriented discourages reproductive learning and promotes constructive learning, especially when conceptual and epistemological relations within the learning domain are stressed. The learning environment preferences of the students were partly related to their learning orientations at the home university, but they were strikingly similar for students from different countries. There was a strong preference for those learning environment aspects that promote constructive learning.

Keywords: higher education, instructional preferences, learning environment, learning strategies, student exchange, teaching style

Introduction

This article reports on the experiences of 610 Dutch students and 241 students from other European countries who have studied at least three months abroad within the framework of an international exchange program. The Dutch students went to a university in another European country and the foreign students went to a Dutch university. In a previous article (Wierstra et al. 1999) we reported about the large differences found between the various countries in home environment and the discrepancies the students experienced between the home and host environment. In the present article we investigate

the relations between the learning environment variables and the learning approaches used by students. An interesting question is for instance to what extent a reproductive learning approach by students is encouraged by certain learning environment characteristics. Some indications of this are reported in the literature. Studies by Entwistle and Ramsden (1983), Meyer and Parsons (1989), Gow and Kember (1990), and Eley (1992) suggest that the perception of a heavy workload provokes a reproducing – oriented learning approach. Trigwell et al. (1997, 1999a,b) found that the students of teachers with an information – transmission approach were more likely to adopt a surface approach to learning. Hollanders (1995) indicates that students who experience the learning environment as elaboration – oriented are more inclined to use an elaboration – oriented learning approach.

Theoretical framework

Student perceptions of the learning environment

Many learning environment measurements that are reported in the literature – and also in this investigation – concern the learning environment *as perceived* by the students. Although these measurements refer to subjective student perceptions, there is reason to assume that these can give adequate and appropriate information about the real teaching – learning situation. Wierstra and Wubbels (1994) report that the *within* class variance of these measurements is considerably lower than the *between* class variance. Further, in studies in which both classroom observation is used and questionnaires are administered, high correlations are often found between three different measures: the externally observed learning environment score, the teacher perception measured by a questionnaire, and the aggregated student perception (Tobin et al. 1990).

The convergent validity considerations mentioned in the previous paragraph and budgetary considerations are not the only reasons for measuring student perceptions instead of 'objective' learning environment data (from other sources not coloured by student perceptions). Another reason is that one may question if the 'objectively measured' learning environment is really important where learning approaches are concerned. Many researchers think that it is ultimately the individual *perception* of the learning environment by the learner that makes him or her use that particular learning approach and not necessarily the context in itself (e.g., Ramsden 1988; Entwistle 1991; Meyer and Parsons 1989; Meyer and Muller 1990).

Learning approach: General predisposition versus actualised learning strategy

A student's learning approach may be regarded as a typical coherent combination of several components: views about learning, regulation activities (also called: metacognitive learning activities) and processing activities (e.g., Vermunt 1998). Most learning approach researchers assume both a certain stability and variability of learning approaches. In investigations of Vermetten et al. (1999a,c) the *variability* manifests itself as a *difference in the extent* to which the learning approach is used on two different times or in two different teaching units and the *stability* is expressed in a high correlation between the two learning approach measurements. In view of the simultaneous stability and variation of learning approaches (not only found by Vermetten but also by many other researchers, e.g., Entwistle and Ramsden 1983), several authors (e.g., Newble and Entwistle 1986; Ramsden 1988, 1992; Wierstra and Beerends 1996; Richardson 2000) make a conceptual distinction between on the one hand the student's *general predisposition* towards a particular approach (with which he or she enters a new course unit) and on the other hand the finally *actualised learning strategy* in this course unit (the actual processes or strategies employed in a specific learning situation, called 'learning in context' by Ramsden 1988). Much conceptual confusion in literature and seemingly contradictory results are in our opinion caused by neglecting this distinction. The general predisposition (or learning orientation) of a student is a *habitual* tendency that exists in a particular time to learn in a particular way at the university (and maybe in other instructional situations). Wierstra and Beerends (1996) assume that a student's learning orientation determines to a large extent the kind of learning environment preferred by him or her (see also Peltonen and Niemivirta 1999). In agreement with this, Vermunt and Verloop (1999) state that the learning orientation can be more or less (in)congruent with the learning environment as experienced by the student. We assume that a student's finally actualised learning strategy is on the one hand dependent on this learning orientation (which is responsible for the relative stability of learning approaches) and on the other hand on the learning environment (which is responsible for the variability of learning approaches). In this interaction process some learning approaches may be more stable than others, as was found by Meyer and Muller (1990) and Vermetten (1999a).

Constructive and reproductive learning

The learning approaches which are central in our investigation are constructive and reproductive learning. We call learning 'constructive' when

processes of relating and structuring and critical processing play an important part. We call learning 'reproductive' when processes of memorizing and stepwise processing (Vermunt 1996, 1998) are central processes. Often researchers and people in the field consider reproductive learning and constructive learning as two contrasting poles on one dimension and accordingly use terms such as deep and surface learning, suggesting a negative correlation between the two learning modes. It is tempting, but in our opinion incorrect, to regard the distinction between constructive and reproductive learning as equal to the distinction between meaningful and rote learning. Constructive learning and reproductive learning, as operationalised in many questionnaires (e.g., Vermunt's ILS, Biggs' SPQ and Entwistle's ATI) are certainly not negatively correlated, but turn out to be independent from each other or sometimes slightly positively correlated. Evidence for this is given amongst others by Biggs and Rhin (1984), Wierstra and Beerends (1996), Hollanders (1995), Slaats et al. (1999), Vermetten et al. (1999a,c) and Ajisuksmo (1996).

In addition to the non-negative correlations between scales for constructive and reproductive learning, there are other indications that the two learning modes cannot be regarded as opposites. Thus, Vermetten et al. (1999c) and Busato et al. (1998) discovered in longitudinal investigations that students reported an increase in constructive learning approaches during the curriculum, but no decrease in reproductive learning approaches. Across courses, Vermettten et al. (1999a) found a higher stability of reproductive learning approaches than of constructive learning approaches. Furthermore, Vermetten et al. (1999b) found that IQ correlates moderately with constructive learning, but not with reproductive learning. Peltonen and Niemivirta (1999) also provided evidence that constructive and reproductive learning cannot be regarded as opposites. They found on the one hand high correlations between constructive learning and learning environment preferences (students with a constructive learning approach prefer a learning environment directed at differentiation and independent learning), but on the other hand almost no correlations between reproductive learning and learning environment preferences.

Student-oriented – conceptualization-oriented – and reproduction-oriented-learning environments

From pilot interviews that we conducted with exchange students (Evers 1995; Huijbregts and Roepers 1995) three general features of the learning environment seem to be particularly relevant to our investigation (because they differentiate between university learning environments and were reported by students to have had an impact on their way of learning). These are the extent

to which the learning environment is 'student-oriented', 'conceptualization-oriented' and 'reproduction-oriented'. We consider the learning environment *student-oriented* in the extent to which it is oriented to active learning by students with an important degree of student self-regulation. The learning environment is *conceptualization-oriented* in the extent to which it is oriented to conceptual and epistemological relations within the learning content domain. Finally, the *reproduction-orientedness* of the learning environment refers to the extent to which the learning environment in the opinion of the students stresses memorizing of facts. Indications for operationalizing the three learning environment characteristics by measuring student perceptions are given by Wierstra and Beerends (1996) and Hollanders (1995).

Hofstede' s (teaching) culture dimensions: 'power distance' and 'uncertainty avoidance'

In our study the learning environment and the learning approaches of students from different countries are investigated. The different countries can be grouped according to their similarity in teaching cultures. Hofstede (e.g., Hofstede 1986, 1991, 1996) distinguishes two teaching culture dimensions, 'power distance' and 'uncertainty avoidance', that are clearly related to the learning environment aspects that are central in our study. *Power distance* defines the extent to which the less powerful persons in a society accept inequality in power and consider it to be normal. *Uncertainty avoidance* defines the extent to which people within a culture are made nervous by situations which they perceive as unstructured, unclear, or unpredictable; situations which they therefore try to avoid by strict codes of behaviour and a belief in absolute truths. Hofstede states that these two culture dimensions affect all institutions of a society, also its schools and the roles of teachers and students. For instance large power distance and strong uncertainty avoidance may affect the teaching situation in such a way that both teachers and students expect the teacher to take all initiatives, which may result in a less student-oriented and more reproduction-oriented learning environment.

Research questions

The present study investigated differences between students from different countries in learning approaches and in learning environment preferences and investigates to what extent these differences are related to differences in learning environment. More specifically, the following research questions were formulated:

Table 1. Subdivision of the group foreign (non-Dutch) students (241)

Group	Countries	Characteristics according to Hofstede
South European students (95)	Spain Italy France Greece Belgium Portugal	large power distance strong uncertainty avoidance
North West European students (78)	UK Sweden Denmark Finland Norway Ireland	small power distance weak uncertainty avoidance
German speaking students (47)	Germany Austria Switzerland	small power distance strong uncertainty avoidance
Eastern European students (21)	Poland Hungary Slovenia Czech Republic	not in Hofstede's study

1. To what extent is the degree of reproductive and constructive learning of a student at the home university related to the region in which it is located and to the perceived reproduction-orientedness, student-orientedness and conceptualization-orientedness of the learning environment at the home university?
2. Is a change in the perceived learning environment during the exchange accompanied by a shift in the students' way of learning?
3. To what extent are students' learning environment preferences related to the region, to their perceptions of the learning environment of their home university, and to the degree of their constructive and reproductive learning at the home university?

Method

Sample

A questionnaire was sent to foreign students studying in the Netherlands during the exchange period, and to Dutch students studying abroad. The Dutch students received a questionnaire in the Dutch language, the foreign students in the English language. We received data from 610 Dutch students and 241 foreign students. The foreign sample contains students from nineteen countries. For some countries only a few students were represented. Therefore we divided the foreign sample into four larger subgroups on the basis of geographical criteria and Hofstede's cultural dimensions 'power distance' and 'uncertainty avoidance'. Using Hofstede's ratings of the countries on

these dimensions, the group of foreign students can be subdivided into the four groups shown in Table 1.

62% of the respondents were female students. The distribution of the fields of study was about the same in the different groups. Most respondents (76%) studied three years or more before they participated in the exchange program. 46% of the Dutch students went in the exchange period to – what is called in Table 1 – the 'North West European' group of countries (especially Great Britain), 41% to the 'South European' group, and 10% to Germany or (many fewer) Austria. A more detailed characterization of the groups and each individual country by gender and field of study is given by Wierstra et al. (1999).

The assessment of learning approaches

For measuring the learning approaches of the students several options were available. Richardson (2000) gives an overview and a critical review of some well-known learning approach questionnaires, in particular Biggs' SPQ, Entwistle's ASI, and Vermunt's ILS. Inspecting Richardson's evaluation of the quality of the instruments (an evaluation on standard psychometric criteria, but also an evaluation of the theoretical scope of the instruments and the usefulness for different cultures and systems of higher education) we chose the ILS (Vermunt 1996, 1998). The ILS was constructed by Vermunt after his review of the other existing instruments and was empirically tested by him and others during several years in The Netherlands and in other countries (Lonka 1997; Ajisuksmo 1996). Moreover, the ILS has a broad scope. In contrast with other instruments the ILS does not simply measure views on learning and cognitive processing activities, but the twenty scales cover also the extent of students' metacognitive (regulative) activities, which is congruent with our definition of learning approach, given in the section 'Theoretical framework'. Especially attractive was the ILS version used by Vermetten et al. (1999a,c). This version is shorter than the original version (100 instead of 120 items) and Vermetten has convincingly shown that this version appeared to be able to assess differences in learning approaches in different teaching periods and different teaching units. This is exactly what we wished to investigate. The students in our study responded twice on the ILS items, once with their home university in mind and once with their host university in mind.

The items are of the Likert type. They ranged from 1 ('I completely disagree') to 5 ('I completely agree') for the items about views on learning. For the items about processing- and regulation-activities the scores ranged from (1) 'I never or hardly ever did this' to (5) 'I (almost) always did this'. The factor structure on scale- and item-level turned out to be much

Table 2. Scales for constructive and reproductive learning and some sample items

	Sample items
Constructive learning	
Processing- and regulation strategies	
Relating and structuring	I tried to combine the subjects that were dealt with separately in a course into one whole.
Critically processing	I tried to be critical of the interpretation of experts.
Self-regulation of learning process and results.	To test my learning progress, I tried to answer questions about the subject matter which I made up myself.
Self-regulation of learning content	In addition to the syllabus, I studied other literature related to the content of the course.
Views on learning	
Construction of knowledge	If I find it difficult to understand a particular topic, I consult other books of my own accord.
Reproductive learning	
Processing- and regulation strategies	
Memorising and rehearsing	I memorised lists of characteristics of a certain phenomenon.
External regulation of learning process	I studied according to the instructions given in the study materials or provided by the teacher.
External regulation of learning results	I tested my learning progress solely by completing the questions, tasks and self-tests in the course materials.
Views on learning	
Intake of knowledge	To me, learning is making sure that I can reproduce the facts presented in a course.

the same for the Dutch group and the foreign group and similar to those reported previously for Dutch students (e.g., by Vermunt 1998; Vermetten et al. 1999a,c). Based on the results of these factor analyses the extent of *constructive* learning was measured by summating the 25 items from the scales 'relating and structuring', 'critically processing', two 'self-regulation' scales, and 'construction of knowledge'. The extent of *reproductive* learning was determined by summating 20 items from the scales 'memorizing and rehearsing', two 'external regulation' scales and 'intake of knowledge'. In Table 2 these subscales and some sample items are given.

The correlation between reproductive and constructive learning appeared to be nearly zero in the entire sample (0.03) and also in the Dutch group

and the foreign group. Thus we may infer that the two dimensions are rather independent, which is in agreement with results of Wierstra and Beerends (1996), and Vermetten et al. (1999c). The Cronbach alpha coefficients of the measures of constructive and reproductive learning at the home- and host-university were between 0.83 and 0.92.

Inventory of Perceived Study Environment (IPSE)

For measuring the learning environment aspects we built on the work of Wierstra and Beerends (1996) and Hollanders (1995). These authors conducted some pilot research in which they measured learning environment characteristics as much as possible in the *same* terms as the learning approaches. For example, a learning approach can be characterized as oriented to reproduction or application, but a learning environment can *also* be characterized as reproduction- or application-oriented. No existing learning environment questionnaire fully satisfies this match of learning environment and learning approach characteristics, and therefore we constructed a new instrument (the IPSE). Nevertheless, in constructing the IPSE items we were inspired by some items from existing instruments (like the IPAL of Wierstra and Beerends, and Ramsden's CPQ), which seem to measure some environment aspects related to student-orientedness and reproduction-orientedness.

We operationalized student-orientedness by five IPSE scales: (1) *student involvement* (interactive ways of teaching), (2) *personalisation* (low social-emotional distance between student and teacher), (3) *participation* (student has a say in way and content of instruction), (4) *individualisation* (attention to a student's self-steering with regard to form and content of the teaching-learning process), and (5) *application* (instruction is directed on application contexts). Conceptualisation orientedness was measured by scale 6, *connectedness* (instruction is directed on conceptual relations in the learning contents domain). Reproduction orientedness was measured by scale 7, *reproduction* (emphasis on student reproduction of teaching content). Sample items from the scales are given in Table 3.

Each of the 37 items is comprised of three parts: a, b, and c, as in the following Application item:

> The teacher makes a connection between theory and examples from practice
>
> a. I would like this to happen in a course
> b. This happened at my own university
> c. This happened at my foreign university

The a-, b- and c-statements are answered on a six-point scale, ranging from 'definitely false' to 'definitely true'. The a-statement is meant to measure

Table 3. IPSE subscales and sample items

Scale	Sample item
Involvement	During classes, the subject matter is discussed with students.
Personalisation	It is easy for students to initiate communication with the teacher.
Participation	The ideas and suggestions of students are used in the course.
Individualisation	I am given the opportunity to pursue my particular interest in the course.
Application	The teacher makes a connection between theory and examples from practice.
Connectedness	The teacher expects students to discover differences and similarities between theories
Reproduction	The teacher expects students to learn definitions by heart as literally as possible.

the preferred learning environment (following Wierstra and Wubbels 1994; Fraser 1994, 1998), and the b- and c-statements the perceived learning environment.

The seven subscales and the overarching scale 'student-orientedness', combining the scales 1–5, were confirmed by correlational and factor analyses (more extensively described in Wierstra et al. 1999). The Cronbach alpha coefficients of all scales were between 0.88 and 0.97. Student-orientedness correlated 0.55 with connectedness and –0.40 with reproduction-orientedness; reproduction-orientedness correlated –0.24 with connectedness.

Results

Research question 1: Predictors of learning approaches at the home university

The analyses regarding research question 1 are inspired by the causal model in Figure 1.

Regarding the first arrow in Figure 1 from region to perceived learning environment at the home university we found large and significant differences between the five regions in the way the students perceive the university learning environment (with a strikingly high score of the South European learning environment on reproduction-orientedness and low scores on student-orientedness and connectedness). In a previous publication (Wierstra et al. 1999) we have reported the results for all learning environment

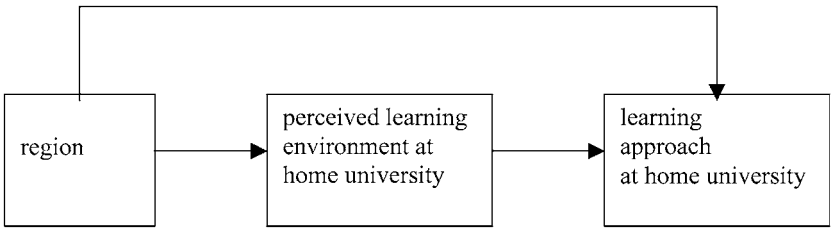

Figure 1. Causal model behind research question 1.

subscales in detail. Now we will mainly concentrate on the learning environment aspects 'student-orientedness', 'connectedness' and 'reproduction-orientedness'. We computed for these scales and the subscales the multiple correlation with four dummy variables (representing the five regions). This multiple regression procedure is equivalent to an ordinary ANOVA (see e.g., Kerlinger and Pedhazur 1973; Cohen and Cohen 1985). We found a multiple correlation of 0.43 ($p < 0.000$) between *student-orientedness* and region (four dummy variables), which means that 19% of the variance in student-orientedness is explained by the region. For *connectedness* we found a multiple correlation of 0.26 ($p < 0.001$). For *reproduction orientedness* the multiple correlation is 0.15 $p < 0.001$). The analyses reported so far refer to the first arrow in the causal model. We want to analyse the whole Figure 1 model by correlation- and regression-procedures and that is the reason why we analysed above the first part of the model by a (multiple) correlation analysis with dummy variables and not by an ordinary ANOVA.

Predictors of constructive learning

The arrow from the second to the third variable in Figure 1 refers to the relation between learning environment perception and learning approach. As a first step in investigating these relations we computed correlations between on the one hand the scales for the perceived learning environment (seven separate scales and the combined scale student orientedness) and on the other hand the scale for constructive learning (first column of Table 4).

As Table 4 shows the best predictor for constructive learning was *connectedness* (r = 0.35, $p < 0.01$). Significant Pearson correlations were also found for *student orientedness* of the learning environment (r = 0.20, $p < 0.01$) and the separate components of it. These results suggest that a learning environment that is oriented to connectedness and to a lower extent a student-oriented learning environment have a positive effect on constructive learning. However, these correlations could be spurious, due to the combination of a direct effect of region on perceived learning environment and a

Table 4. Correlations between learning environment perception and learning approach at the home university

	Constructive learning	Reproductive learning
Reproduction	–0.09*	0.41**
Connectedness	0.35**	–0.06
Involvement	0.18**	–0.14**
Personalisation	0.10**	–0.05
Participation	0.17**	–0.25**
Individualisation	0.21**	–0.14**
Application	0.15**	0.04
Student oriented	0.20**	–0.13**

*$p < 0.05$ (2-tailed).
**$p < 0.01$ (2-tailed).

direct effect – as indicated by the upper arrow in the model – of region on constructive learning. This means that region would be a spurious factor. In order to check this we computed the partial correlations between the learning environment scales and constructive learning (partialling out region). These partial correlations hardly turned out to differ from the zero order correlations, which indicates that there is a direct effect of connectedness and student-orientedness on constructive learning.

In order to estimate the effect of connectedness on constructive learning we conducted multiple regression analyses. The (multiple) correlation between constructive learning and region (four dummy variables) is only 0.16, which is very low compared with the correlation of 0.35 between constructive learning and connectedness. The direct effect of connectedness on constructive learning is 0.33 and the direct effect of region on constructive learning (not mediated by the perceived connectedness of the learning environment) is only 0.07. Another way of assessing the effects of region and connectedness is to look at the explained variance of constructive learning. When both region and connectedness of the learning environment are included in the multiple regression equation as predictors of constructive learning, the multiple correlation is 0.42 (both predictors explain 18% of variance). This correlation is not significantly higher than the correlation of 0.35 between connectedness of the learning environment and constructive learning (which explains 12% of variance).

We conclude from all analyses that constructive learning is related to a learning environment that stresses conceptual connections between the contents of the learning domain and that is student oriented.

Predictors of reproductive learning

The correlations between reproductive learning and the various learning environment characteristics are given in the second column of Table 4. The highest correlation was found between reproductive learning and reproduction-orientedness of the learning environment (r = 0.41). Further, we found a significant negative correlation between reproductive learning and student orientedness of the learning environment (r = –0.13); the following aspects of student orientedness turned out to be especially important: participation (r = –0.25), individualisation (r = –0.14) and involvement (r = –0.14).

The partial correlations (partialling out region) were of the same order as the zero order correlations. Furthermore the (multiple) correlation between reproductive learning and region (four dummy variables) is low (0.14). The direct effect of reproduction-orientedness on reproductive learning is 0.40 and the direct effect of region on reproductive learning (not mediated by the perceived reproductiveness of the learning environment) is again only 0.07. When both region and reproduction orientedness of the learning environment are included in the multiple regression equation, the multiple correlation is 0.42 (both predictors together explain 18% of variance). This correlation is not substantially higher but almost equal to the correlation of 0.41 between reproductive learning and reproduction-orientedness of the learning environment

We conclude from all the analyses that reproductive learning is related to a learning environment that stresses memorizing of facts and that gives the student few incentives towards active participation in the course.

Research question 2: relations between changes in learning environment (perception) and changes in learning approach

In order to investigate research question 2 we computed for each student two kinds of *change* scores: on the one hand *learning environment perception* change scores (for reproduction orientedness, connectedness and student orientedness) and on the other hand *learning approach* change scores (for constructive learning and reproductive learning). Each change score is the difference score obtained by subtracting the home university score from the host university score. Table 5 shows the correlations between the two kinds of change scores.

All correlations in Table 5 turned out to be significant ($p < 0.001$) and are in agreement with the results of research question 1. Thus, in addition to the results of research question 1, it seems again that a more student-oriented and conceptualization-oriented environment fosters a constructive learning

Table 5. Correlations between learning environment- and learning approach change scores (all $p < 0.001$)

Learning environment change	Learning approach change	
	Constructive learning change	reproductive learning change
Reproduction-orientedness change	–0.33	0.41
Connectedness change	0.42	–0.24
Student-orientedness change	0.39	–0.20

approach and a more reproduction oriented learning environment fosters a reproductive learning approach.

In a second analysis we looked at the change socres of two *opposite* exchange groups: Dutch students going to South Europe and South European students going to The Netherlands. As already described in a previous publication (Wierstra et al. 1999) these two exchange groups experienced a large and *opposite* change in learning environment during the exchange. This can be seen in Table 6.

In the first two rows and columns 1–3 the learning environment change scores are given for the two groups. In columns 4 and 5 the learning approach changes are given. For Dutch students in the sample constructive learning decreases when they study in a South European country, while for South European students constructive learning increases when they study in the Netherlands. For reproductive learning the reverse is true. We tested by t-tests for two independent samples whether the learning approach *change* scores of the South European students differ from the *change* scores of the Dutch students. It appeared that the Dutch and South European students differ significantly on the learning approach change scores (for constructive learning $p < 0.003$ and for reproductive learning $p < 0.03$).

We conducted the same analyses for the students going from the Netherlands to another North West European country and North West European students going to The Netherlands. These two groups also experience a certain learning environment change during the exchange but considerably smaller than the two first mentioned groups (rows 3 and 4, columns 1–3 in Table 6). It appeared that for Dutch students the constructive way of learning increases when they study in a North Western country and the reproductive way of learning decreases. For the North Western students going to the Netherlands the reverse is true. These differences in learning approach

Table 6. Learning environment changes and learning approach changes of opposite exchange groups

	Change in learning environment perception			Change in learning approach	
	Reproduction orientedness	Connectedness	Student orientedness	Constructive learning	Reproductive learning
Dutch students going to South Europe	0.90	–0.57	–3.05	–0.42	0.43
South European students going to The Netherlands	–0.49	0.78	6.43	0.38	–0.02
Dutch students going to North West Europe	–0.28	0.17	1.26	0.52	–0.33
North West European students going to The Netherlands	0.28	–0.29	–0.89	–0.45	0.19

change turned out to be significant (for constructive learning $p < 0.003$, and for reproductive learning $p < 0.016$).

Thus, all differences between learning approach change scores in Table 6 are significant and consistent with the learning environment changes shown in the same table. An increase in the perception of a student-oriented learning environment appeared to be associated with a increase in the extent of constructive learning, and a increase in the perception of a reproduction-oriented learning environment appeared to be associated with an increase of reproductive learning.

Research question 3: predictors of learning environment preferences

As already reported by Wierstra et al. (1999) students generally prefer a learning environment that is less reproduction-directed than they are used to and they wish a stronger emphasis on the active learning environment aspects. The shape of the preference profiles turned out to be rather similar for the different regions. This suggests that the preference for certain learning environment aspects in not strongly determined by regional characteristics and by instructional characteristics in which these regions appeared to differ.

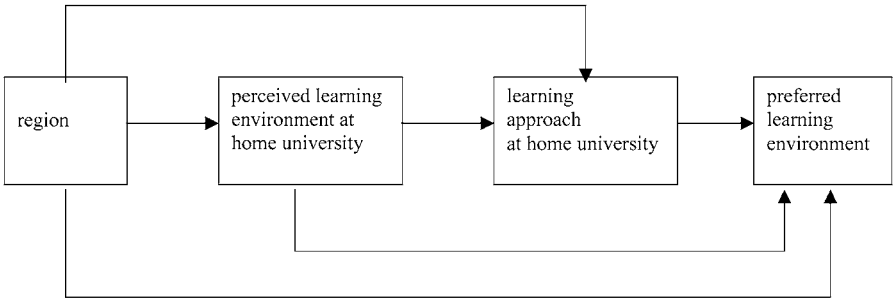

Figure 2. Causal model behind research question 3.

Perhaps the learning environment preference is determined for a greater part by personal student characteristics. As the literature suggests (e.g., Peltonen and Niemivirta 1999) such as causally important student characteristic might be the habitual learning orientation of the student. Therefore we investigated the relation between the learning approach at the home university (which could be conceived as an indicator of the habitual learning orientation) and the learning environment preference. Our analysis was based on the causal model in Figure 2.

Departing from the model in Figure 2 we conducted hierarchical regression analyses, using as the dependent variable the following variables: preferred student orientedness, preferred connectedness and preferred reproductiveness. The following *categories* of predictors were entered successively in the regression equation: *learning approach at the home university* (constructive learning and reproductive learning), the *perceived learning environment at the home university* (perceived student orientedness, connectedness and reproduction orientedness), and *region* (four dummy variables). Kerlinger and Pedhazur (1973) call this order of entering the variables the 'backward tracing' method: one starts from the cause closest to the dependent variable and traces backward to the more distant causes (pp. 326, 327). We chose backward tracing because of our interest in the question whether in accounting for variance of the learning environment preference it is sufficient to resort to learning approach at the home university (as immediate cause) or whether it is necessary to include also more remote ones (perceived learning environment and region). Within each of the three categories of independent variables the order of entering was determined by the stepwise multiple regression procedure in SPSS, choosing in each step that category variable which makes a maximum contribution to the prediction.

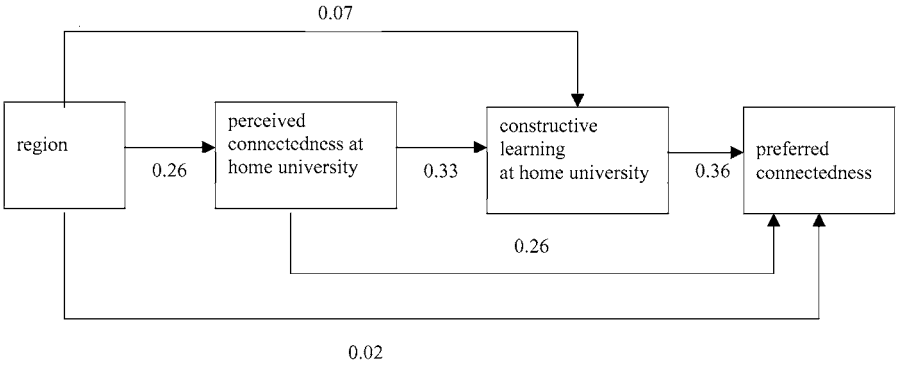

Figure 3. Summary of results regarding constructive learning and connectedness.

Preference for connectedness of the learning environment and preference for a student oriented learning environment

The hierarchical regression analyses show that preference for connectedness of the learning environment and for a student-oriented learning environment is mainly predicted by a student's degree of constructive learning (R = 0.45, and 0.29 respectively; $p < 0.001$). the addition of perceived learning environment aspects and region to the regression equation enlarges the correlation with maximally 0.07. We conclude that students who learn constructively prefer a learning environment which is oriented to connectedness and which is student-oriented. Some combined results for research questions 1 and 3 regarding constructive learning and connectedness are depicted in Figure 3.

Preference for a reproduction-oriented learning environment

We also conducted hierarchical regression analyses for the preferred reproduction-orientedness. Again the region makes no significant contribution to the multiple correlation. A difference from the results of previous analyses is that the preference for a reproduction-oriented learning environment is more strongly predicted by learning environment aspects to which the student is accustomed than by the learning approaches at their home university. The extent to which a reproduction-oriented learning environment is preferred is predicted in the first instance by the extent to which the student is accustomed to a reproduction-oriented learning environment at their home university and only in the second instance by the extent to which the student has a reproductive learning orientation. The multiple correlation of preferred reproduction-orientedness with perceived reproduction-orientedness at the home university and reproductive learning at the home university is 0.58, with standardized regression coefficients of 0.43 and 0.27 respectively. We

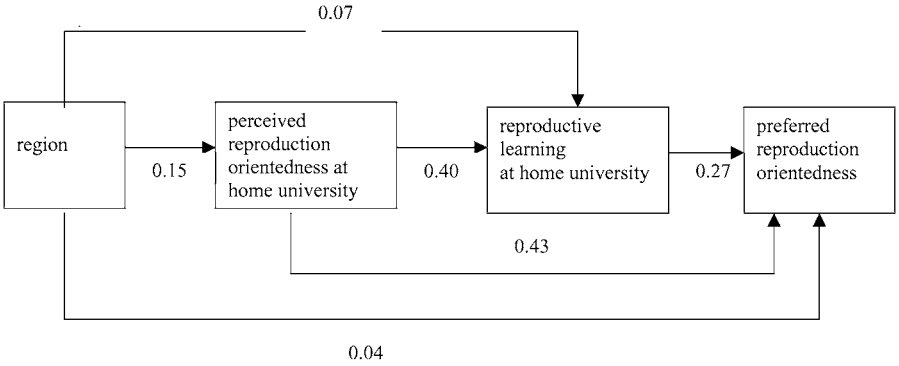

Figure 4. Summary of results regarding reproductive learning and reproduction oriented learning environment.

conclude that when students are exposed to a prolonged reproduction-oriented learning environment they may resign themselves to that and adapt their aspiration levels.

Some combined results of research questions 1 and 3 regarding reproductive learning and reproduction oriented learning environments are depicted in Figure 4.

Conclusion and discussion

The learning approaches of students at the home university and the host university were measured by means of a short version of Vermunt's ILS. The extent of constructive and reproductive learning were measured, comparable with deep and surface learning (Marton et al. 1984) but without the connotations of a strict polarity and also comprising metacognitive activities. It appears that constructive and reproductive learning cannot be considered as opposites, but as two different learning approach dimensions.

By means of the Inventory of the Perceived Study Environment (IPSE) learning environment aspects were measured concerning the home university, the host university and the ideal learning environment. Reproduction-orientedness of the learning environment, conceptualization-orientedness (connectedness) of the learning environment and student-orientedness (personalisation, involvement, participation, individualisation and application) were measured. A learning environment that stresses memorizing of facts and does not invite the student to participate actively in the course, prompts the student to learn reproductively. A student-oriented learning environment, and especially one oriented to connectedness, appears to stimulate constructive learning.

The above mentioned relations between learning environment and learning approach were confirmed by the relations found between changes in learning environment and changes in learning approach, e.g., the South European students show a tendency to learn somewhat more constructively and less reproductively during their stay at a Dutch university, because they experience the Dutch learning environment as less reproductive and as providing more opportunity for student involvement. The effects are not very large: there is no determining influence but a facilitating or inhibiting influence of the learning environment on learning approaches. Whether a person will learn constructively is probably not merely dependent on learning environment characteristics, but also on individual person characteristics (Wierstra and Beerends 1996). Although the influence of the learning environment should not be overestimated, a change of learning environment (characteristics) could lead to a change of learning approaches. In this study the students appear to be inclined to adapt their learning approaches to the characteristics and demands of the learning environment, a possibility that is allowed by the variability-stability model, presented in the section Theoretical Framework.

We also investigated to what extent learning environment preferences of students were dependent from the learning environment they are accustomed to and from their habitual learning orientations. There is considerate agreement amongst students from different countries – with strongly contrasting learning environments – about the desired learning environment. They reject a learning environment with an emphasis on learning facts, but this is less valid for students who are used to a reproduction-oriented learning environment, and for students who learn reproductively. Generally the ideal learning environment should in the opinion of the students imply much personalisation (small distance between teacher and student) and much student involvement. The preference for a student-oriented learning environment and a learning environment oriented to connectedness is mainly associated with students who learn constructively and who are accustomed to such a learning environment.

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