Journal of Problem Based Learning in Higher Education

VOL. 9, NO 2, 2021 – Page 22-45
10.5278/ojs.jpblhe.v9i2.6620

How Differences in Motivation and Identification Shape Four Types of Student Experiences with Problem-Based Learning

Katrine Buus and Louise Møller Pedersen *

ABSTRACT

This article examines why students experience Problem-Based Learning (PBL) environments differently and discusses considerations for improving PBL environments to support a more diverse student population. Based on theoretical perspectives regarding motivation, identification, and learning, we present a new typology consisting of four types of students with distinctly different ways of creating motivation and identity in a PBL environment. While some principles in the examined PBL model motivate and validate certain types of students, the same principles can also challenge identification or result in demotivation among other types of students. Both results are important to consider when developing an inclusive PBL environment. The typology can serve as a theoretical framework for understanding, analysing, and discussing how and why students experience contemporary or new learning environments differently. Additionally, the typology provides a tool for organizations and teachers to motivate and validate students with different type characteristics and improve PBL practices accordingly.

Keywords: Problem-Based Learning, Diversity, Motivation, Identity, Student Types.

PBL AND STUDENT DIVERSITY

A general view on education as a necessary qualification for entering the modern labour marked and a prerequisite for economic growth has supported the development towards a more diverse student population in higher education in many European countries (Gilardi & Guglielmetti, 2011; Langholz, 2014, UKRVU, 2015). Sociological research

* Katrine Buus, Department of Sociology & Social Work, Aalborg University, Denmark
Email: katrinebuus@socsci.aau.dk
Louise Møller Pedersen, Department of Sociology & Social Work, Aalborg University, Denmark
Email: lmpd@socsci.aau.dk

on student diversity has provided valuable insight into issues of access, dropout, completion, and performance in higher education (McDonough & Fann, 2007; Antonio & Muñiz, 2007; Caspersen et al., 2012). Other studies have raised awareness to the challenges so-called 'non-traditional´ students face opposed to ´traditional´ students usually characterized as 19-year-olds, newly graduated from high school, and mostly from families of medium to high socio-cultural status (Gilardi & Guglielmetti, 2011). Social categories such as gender (Søndergaard, 1996), class (Thomsen, 2010) and educational background (Højberg & Martinussen, 2015) give students different prerequisites for navigating the culture and expectations in higher education (Ulriksen, 2009). These insights have emphasized the need for a better understanding of the processes and conditions that hinder or promotes the benefits of a more diverse student population (Chang, 2013; Johannsen et al., 2013).

It has been proposed that Problem-Based Learning (PBL) offers a more inclusive learning environment in higher education (Taylor & Burgess, 1998; Khan & Sobani, 2012). Core principles such as group work and collaboration in PBL seem to enable a process where challenges connected to diversity are gradually reduced (Khan & Sobani, 2012), and students come to regard the ability to cooperate across differences as a valuable social and professional competence (Engen et al., 2017, 2018). Teachers play an important role in facilitating this process of inclusion (Krogh & Jensen, 2020). However, helping students to overcome their differences and merging different experiences with PBL can be difficult for organizers and teachers (Engen et al., 2017). Not least since the majority of the PBL literature and teaching presents PBL as a 'one size fits all' model. PBL may enhance students' motivation but does not always result in autonomous intrinsic motivation (Wijnia et al., 2011) and in fact, students can be motivated quite differently from what teachers expect (Kyed & Pedersen, 2016).

There is a need for further theoretical and practical knowledge of the different ways students experience PBL and why (Krogh & Wiberg, 2013; Engen et. al., 2018). In this article, we examine the following research question: *Why do students experience a problem-based learning environment differently?* We propose that differences in the students' motivation, identification and understanding of learning shape their experiences of PBL. Based on theoretical perspectives on motivation (Ryan & Deci, 2000) identification (Jenkins, 2006) and learning (Ellström, 1996), we identify four theoretical types of students: 1) The Job-Focused Practitioner, 2) The Social Collaborator, 3) The Subject-Enthusiast, and 4) The Directionless Explorer. We examine how these four types have distinctly different ways of constructing motivation and identity around studying Sociology at Aalborg University, Denmark (AAU) as an educational setting based on the principles of PBL (AAU, 2015) and how these differences shape their understanding of

learning and experience with PBL. We then discuss important considerations for improving PBL environments to support a more diverse student population.

This typology not only considers the differences in students' motivation, identification and understanding of learning in a PBL environment, but also how these differences are actively shaped in interactions with their learning environment. By focusing on students' agency and construction of meaning in their learning environment, we aim to understand not just the different pieces in this puzzle, but also the different ways students try to make them fit. This perspective on student diversity gives new insight into the importance of recognizing different ways of navigating and constructing meaning in higher education, which moves beyond merely distinguishing between ´academic´ and ´non-academic´ (Biggs & Tang, 2007) or ´traditional´ and ´non-traditional´ students (Gilardi & Guglielmetti, 2011). If we are to fully understand the complexity of a more diverse student population and improve higher education environments accordingly, we must consider these notably different ways of studying and how they are shaped within in learning environments (Boeskov et al., 2003; Holmegaard et al., 2014; Møldrup, 2018).

DESIGN AND METHOD

The typology was developed as part of a study on motivation, learning and study intensity in PBL workshops at the bachelor programme in Sociology at AAU (reported in Pedersen et al., 2018). Like other social sciences, Sociology does not offer a clear professional profile for a well-defined labour market such as 'psychologist' or 'lawyer'. Therefore, students must make a greater effort to construct motivation and identity in relation to their chosen field of study, and we expected to find different ways of doing so among the students. The following dissemination of the study is based on the COREQ-guidelines for qualitative research (Tong et al. 2007).

At the Sociology programme, the format of workshops varies across semesters and courses. The students will often encounter a variety of PBL practices across the different workshops. Therefore, students continuously need to adapt to and make sense of these changing learning environments, making them interesting places to examine different experiences with PBL. In this study we used a case study design and two courses were strategically selected (Flyvbjerg, 2006) based on significant differences expected to influence motivation and identification in the students' experiences with the PBL environments. This included differences such as semester level, obligatory vs. elective course, full day vs. two-hour workshops, authentic case vs project-oriented assignments, and varying degrees of autonomy and teacher involvement. We selected these cases to achieve the greatest possible variation in a *most dissimilar design*, which is particularly

useful for identifying possible relationships between the studied phenomenon and the given context (Antoft & Salomonsen, 2007).

The case study used method triangulation consisting of in-depth semi-structured interviews with 10 students, participant observations (3 workshops at each course) and questionnaires (84 students answered, 46% response rate). The typology is primarily based on interview analysis and secondary on observations. Since the second author was teaching at one of the studied courses, we took great care in securing students' anonymity and creating a space where students could share both positive and negative experiences with PBL. All interviews were conducted, audio recorded, transcribed, and coded by the first author. The interview participants had answered the questionnaire and signed up for interviews. Before the interviews, the students were contacted by email and informed of the purpose of the interview. One participant chose to withdraw her participation due to time issues. We conducted the interviews in March (Course 1) and October (Course 2) 2017 at the university and they lasted between 40-90 minutes. We interviewed students on their experiences with the course workshops, workshops in general, their overall experience with the PBL model, and reasons for choosing the study programme. Both positive and negative experiences with workshops, as well as a variation of primary type characteristics, are present among the interviewees across courses.

The interviewed students and their primary type characteristics are listed in Table 1.

Interview	Gender	Age	Semester	Course	Primary type (s)	Experience with PBL-workshops
1	W	25-27	6th	1	JP	Negative
2	W	22-24	6th		SC	Positive
3	M	22-24	4th		DE/JP	Positive
4	W	25-27	6th		JP/SC	Negative
5	W	20-21	3rd	2	SC/SE	Positive
6	W	27+	3rd		SE	Positive
7	W	22-24	3rd		SC	Positive
8	W	25-27	3rd		JP	Negative
9	W	20-21	3rd		SE	Positive
10	W	22-24	3rd		DE	Negative

Table 1. Interview participants. Abbreviations: JP: Job-focused Practitioner; SC: Social Collaborator; SE: Subject Enthusiast; DE: Directionless Explorer.

ADAPTIVE THEORY AND TYPOLOGY

Bailey (1994) argues that typologies form a solid platform for both empirical research and theorizing. By reducing complexity, a typology allows us to compare types rather than individual cases. In this study, we developed the typology using the analytical approach of *adaptive theory* (Layder, 1998; Jacobsen, 2007). Developing a typology

using an adaptive approach is a process of mutual influence of both theoretical concepts and data in a dialectic interplay (Layder 1998, p. 77). We used three theoretical perspectives as the framework for the design and analysis, while other concepts were introduced during analysis to refine data emergent themes. These *orienting concepts* and the data were synthesized, and possible new themes or distinctions in the material were identified (Layder, 1998; Jacobsen, 2007).

The three theoretical perspectives in the overall framework were: 1) identification, 2) motivation, and 3) learning. Jenkins (2006) theory on social identity as continuous process of identification, categorisation, and validation was used to understand students' construction of identity in their learning environment. Ryan & Deci (2000) distinction between six types of motivation - ranging from intrinsic to four different forms of extrinsic motivation and lastly amotivation - were used to identify differences in students' motivation. Lastly, Ellströms (1996) four different action-, knowledge- and learning levels were used to identify differences in how the students understood their learning environment and their experience with different levels of autonomy. While individual concepts are presented in the analysis, further description of the theoretical framework can be found in Pedersen et al (2018).

To explore the overall experience of individual students the interviews were initially condensed using text condensation, comparing how and why they differed, and the link between themes in the different experiences. The interviews were then coded in Nvivo 11 using the orienting concepts from the three perspectives as well as emerging themes describing students' experiences with teachers, learning activities, the PBL principles, and reasons for studying Sociology. When needed, theoretical concepts such as facilitator roles (Kolmos et al., 2008) were introduced to refine emerging themes. During the analysis, the research team discussed findings and interview quotes regularly. We compared findings with observations and validated these with other relevant studies.

The developed typology is inspired by Weber's concept '*ideal type'*, which represent a heightened representation of the dimensions within the typology (Bailey, 1994, p. 10). The four student types are an accentuation of the theoretical dimensions and cannot be found empirically in their conceptual purity (ibid.). Additionally, some typical traits are expected to be more pre-dominant than others depending on the empirical context, and may change over time.

A TYPOLOGY OF FOUR TYPES OF STUDENTS

In the following, we present the four ideal types of students with focus on their distinctly different motivations and identifications, views on learning and teacher roles, and

experiences with a PBL environment at AAU (AAU, 2015). Table 2 presents an overview of the four types and their characteristics. In the following analysis, the four types of students are unfolded in detail.

	The Job-Focused Practitioner	**The Subject-Enthusiast**	**The Social Collaborator**	**The Directionless Explorer**
Motivation	Professional possibilities	Academic possibilities	Social possibilities	Unknown possibilities
Identification	Identifies with future job	Identifies with field of study	Identifies with social roles	Lack of identification
Learning	Learning as practice	Learning as formative	Learning as collective	Learning as necessity
Teachers	Teachers facilitates expertise	Teachers facilitates creativity	Teachers facilitates process	Teachers facilitates control
PBL	Transferability in PBL	Autonomy in PBL	Sociability in PBL	Commitment in PBL

Table 2. Four student types and their characteristics.

THE JOB-FOCUSED PRACTITIONER (JP)

The Job-Focused Practitioners stand out due to their strong identification with a future job or career in a practical sense rather than their field of study in general. For these students, the idea of their future professional lives and the process of becoming a professional are essential to how they experience their PBL environment.

Motivated by job goals

With their gaze firmly locked on future jobs, students with the characteristics of the JP evaluate the relevance of individual learning activities and education in general in terms of transferability of knowledge and skills from university to labour market. A student states:

"You need a job. I wouldn't dream of choosing an education for – well, of course it should be of interest to you – but it has to be realistic, I think." (Interview 8)

In a study on how social science students view the relevance of their education, Skardhamar & Baarts (2016) identifies this as 'relevance as skills and generalist competencies' (ibid., p. 109). Because study involvement is considered a mean to increase job possibilities, the JP is extrinsically motivated (Deci et al., 1991). Participating in learning activities is seldom for the sole enjoyment of these activities but rather to achieve essential skills relevant in future jobs. Deci et al. (1991) concept of *identification* describes this form of motivation as guided by personal importance rather than external pressure. It is, however, still goal-oriented (ibid., p. 329) and JPs identify with their future (job) goal rather than the process of getting there.

The future professional self

Since JP's motivation is closely tied to a professional future beyond the educational context, it can be very frustrating and demotivating if the transferability of knowledge, skill or a learning activity is not clear to them:

"(..)when I talk with friends and acquaintances at home – and I all of a sudden use a concept I have learned and think is clever… then they just look at me like: What is she talking about?(..) So, I find it frustrating, that I have all this knowledge and some sort of scientific foundation, but I don't know how to translate it into something I can actually use in the real world with ordinary people." (Interview 1).

As Jenkins (2006) argues, we cannot merely claim an identity; it must be validated by the people around us (p. 44). Therefore, the opportunity to test professional skills and knowledge in learning activities are important to JPs as this serve to validate their future professional self.

Learning by doing

Since JP understand themselves as practitioners, they will prefer practice-oriented courses and hands-on learning activities. By way of contrast, theoretical subjects and abstract discussions are difficult to translate and link to job practice:

"I have difficulties with the abstract stuff (..). It is not my strong side. So mostly – for me – I use the workshops to test if I have understood it correctly or not. And to use it." (Interview 8).

This applied approach and a need for right and wrong answers are embedded in a tendency to understand learning in terms of method directed learning (Ellström, 1996). These students expect to gain procedural knowledge on which to establish rule-based actions. This lets them acquire skills in analysing problems and finding the best approach (or rule) to solve the problem – also referred to as 'know how' (Ellström, 1996, p. 158). Consequently, they regard teachers as 'experts' and expect them to teach the *correct* skills and rule-based choices:

"You learn through feedback. That is where you learn and find out what you have doing correctly and should keep on doing." (Interview 1)

The JP regard these skills as necessary in their future work. Therefore, they expect some repetition across different learning activities rather than continuously introducing something new, as this allows them to test acquired knowledge or skills and put them into practice.

Transferability in PBL

Being highly motivated by future job goals, the JP will gravitate towards certain elements in the PBL environment related to transferability as these elements help them validate identity and stay motivated. PBL principles (AAU, 2015) such as *exemplarity* ensures that students acquire knowledge and competencies applicable in a wider context than the project they are working on (i.e., professional careers). Additional, *authenticity* requires students to work with authentic problems and opens the possibility of cooperating with companies or institutions outside the university. However, some elements in the PBL environment can also lead to *amotivation* (Ryan & Deci, 2000, p. 61). While JPs value teamwork as a relevant skill in the labour market, peer learning in *group work* and *project work* is often devalued in comparison to learning from 'knowledge experts' such as teachers.

"There is no doubt, that it [group work, red.] provides personal learning. It provides personal growth and reflection, all that, no doubt about it. However, it also shifts the focus away from the academic content. (…). If the purpose is for us to learn to cooperate and learn what it is like to be in a workplace – for example – then you must let us know and prepare us for it. And you do not simply do that by letting it be up to ourselves combined with supervision every now and then..." (Interview 1).

Consequently, the JP expects more teacher-driven learning activities and teacher evaluation of their work. This parallels the master-apprentice relationship of *product facilitation* (Kolmos et al., 2008, p. 37), where answers rather than choices are given, but contrasts the principle of *student responsibility* in PBL (AAU, 2015). Therefore, JPs sometimes find the level of autonomy in PBL frustrating and may feel left to themselves when teachers aim to facilitate the student's own assessment instead of providing the answers:

"(..) When it is open-ended like that, then it is difficult to sit there and say: "Okay! What is the right answer, then?" Then you have no idea what the most correct answer was or whether you have made the right decision." (Interview 4)

THE SUBJECT ENTHUSIAST (SE)

The Subject-Enthusiasts' experiences with the PBL environment are shaped by their strong identification with the subject matter or the academic discipline in general. For these students, the academic content is essential and every opportunity to learn more about it and expand their horizon will grab their attention.

Motivated by academic interest

SEs is often intrinsically motivated since their motivation derives from the satisfaction of learning itself (Deci et al., 1991, p. 330). These students are enthusiastic about the academic content and tend to enjoy all activities that hold a learning potential related to their discipline. To immerse oneself, gain new knowledge and transform one's way of thinking is often articulated as the main reasons for attending university:

"I like becoming smarter. I just think everything is fascinating... It gives me something – getting to that point: Ahh, that's how it is! I think that's really cool – to get an understanding of things." (Interview 9).

Since the prospect of new insights drives these students, they are willing to question both existing understandings within the discipline, their own assumptions, and their learning environment. In their view, critical reflection and new knowledge create tangible changes in their understanding of the world, within their field of study, or in society in general. Therefore, the SEs will regard the relevance of education in a formative manner: as an opportunity to make societal changes or transform one's way of looking at the world (Skardhamar & Baarts, 2016, pp. 107-108).

The knowledgeable self

SEs are more pre-occupied with the academic content than the social dimensions of student life. Their identification revolves around the pursuit of lifelong learning and their formative transformation into the academic discipline. As a result, they identify themselves in opposition to students who are more focus on short-term goals:

"I have heard others say: "But I am not going to use it in the project work, so why should I participate?" And in my opinion, it is not just the project you should have in mind. They are very exam oriented. (..) My point of view is that I may not use it right now, but it is part of my education, so I might use it later." (Interview 9)

Instead, SEs find validation in teachers and other representatives of their field of study as well as fellow students who share their level of academic interest. By way of contrast, SEs find other students' lack of academic interest both uninspiring and demotivating. This might cause some SE to concern themselves with how these representatives perceive

them, but they often prioritise the prospect of new knowledge over their academic performance in learning situations.

Learning new things

Because these students find learning and new knowledge highly motivating, they are actively involved in different types of educational activities and subject areas. However, to catch the eye of the SE these activities must hold new learning potential and spark their academic interest:

"If you want to learn something you have to have some element of interest and motivation. Therefore, it is no use just being handed an assignment. Of course, it might be good practice, but if it has your interest and you are committed, then you will learn a lot more." (Interview 6)

The SE is highly reflective in their own learning process and see both possibilities and limitations in different learning activities. This makes them quick to decipher new learning activities and assess the potential outcome. Their understanding of learning resembles *creative learning* (Ellström, 1996, p. 153,158) since they challenge themselves to find new ways of approaching problems and appreciate high levels of autonomy:

"You satisfy some sort of interest. (..) You try things out and challenge yourself, so you don't always go for the easy choice or somebody tells you "You should do this". You think for yourself and figure out, what is going on." (Interview 5)

Since these students expect each educational activity to challenge and contribute somewhat differently, it can result in *amotivation* if there is too much repetition from one learning activity to the next.

Autonomy in PBL

The SEs value the principles of *student responsibility* and *autonomy* in the PBL model (PBL, 2015) since they allow for independent choices during learning activities and a more explorative approach to their subject of interest:

"(..)It might be a very concrete assignment, but you can approach it any way you like, or you can choose something else. No one is going to say:" We were not supposed to do it like that!" or something like that. And I think that is a good thing, because… responsibility for one's own learning also means that you are allowed to think outside the box." (Interview 6).

While other students might expect teachers to control and test their knowledge, the SE prefer teachers who challenge existing assumptions and provide new learning opportunities through autonomy. This parallels some of the overlooked benefits of

laissez-faire facilitation (Kolmos et al., 2008, p. 37) as it can facilitate students' own initiative, independence, and creativity. By way of contrast, a more controlling approach from teachers can result in *amotivation* and a sense of restriction for the SEs, since it limits their independent pursuit for new insights and challenges. Instead, they expect teachers to introduce new ways of thinking about the subject through academic enthusiasm:

"There is nothing better than being taught by someone truly passionate about their subject matter and who introduces some interesting considerations:" You could look at it that way, but have you considered this and this?" It must be someone skilled in their field of study, but without being arrogant." (Interview 6)

However, the SE's need of academic validation makes them critical towards the lower priority of *individual* feedback and accomplishment they might experience due to the central principles of *group work* and *collaboration* in the PBL model (AAU, 2015).

THE SOCIAL COLLABORATOR (SC)

The Social Collaborators are socially outgoing and their experiences with PBL-based learning are shaped by their strong connection to the social dimensions of the PBL environment. These students enjoy collaboration with peers, collective learning, and the development of social competencies.

Socially motivated

The SCs find the social aspects of their learning environment highly motivating and these might even be the main reason why they have chosen a selective course, a study programme or even a university:

"I like group work and how you get to apply the concepts when you discuss them - instead of just reading a text, writing a paper and handing it in. Then you haven't really used your knowledge in my opinion (...). I think you get a better result from group work – and it's actually the reason why I chose AAU" (Interview 7)

The SC prefer collective PBL activities such as group work and discussions, since they find collaboration and sharing different perspectives with fellow students rewarding and enjoyable. Like the SE, this makes their motivation resemble intrinsic motivation. However, their motivation often takes the form of *integrated regulation* (Deci et al., 1991, p. 330) as their participation is externally oriented towards gaining social competencies through self-reflection. One student gives an example of these reflections:

"What competences could I draw on from other situations and use in this one? What is working in this situation, in this group, and what other things should I draw on in other situations and other groups? That situational awareness and the ability to adjust your behaviour to the situation – instead of always doing the same thing." (Interview 4)

Consequently, these students consider the relevance of their education in terms of a transformation of self. But their social interest may also spark a desire to make a difference – a form of relevance that focus on other people or society in general (Skardhamar & Baarts, 2016, p. 108).

The social self

Unlike JP and SE, the SC identify with social roles in peer groups rather than defining themselves by academic interest or future professions. These students enjoy spending time and discussing with co-students, since it enables them to learn from other people's perspectives:

"In my opinion, you explore more about the topic, when you work together - and it is more fun to discuss it with other people rather than just yourself! (...) I really think you learn a lot by hearing things from all kinds of angles, discussing and really seeing the world as round from all perspectives." (Interview 2)

However, the social sensitivity of SC's makes them particularly preoccupied with their *presentation* of self in social interactions (Jenkins, 2006, pp. 44-45). They can be quite concerned with their performance in educational situations and fellow students' opinions of them; opinions they often value higher than the opinions of their teachers:

"I become very self-conscious and think a lot about how I say things, so I don't sound stupid... I've been in quite ambitious groups, and it's fine, because you learn a lot in those and we have some really good discussions, but I almost get sweaty palms and think to myself: "Now you have to contribute with something clever!" (Interview 7)

This might be especially evident in a PBL environment predominately based on group – and project work where the boundaries between the social and educational context are blurred, making it difficult for students to navigate and maintain a distinction between different social roles.

Learning with others

The SCs' understanding of learning is shaped by their motivation and identification with the social dimension of their learning environment. They regard learning as a collective achievement, and value and understand the importance of other peoples' perspectives in the learning process.

"You get different input, and you might say:" Oh, you think of it that way, I thought of it this way, but maybe we can do it in a totally different way or combine our suggestions?" You must be constructive and be able to look at it differently than your own point of view. That is what I like about group work – more angles to view the same thing." (Interview 5)

Therefore, SCs will often understand learning in terms of *problem-directed* learning (Ellström, 1996, p. 158). This type of learning allows for situations and problems to be assessed and analysed (collectively) from different perspectives drawing on prior experiences and theoretical knowledge leading to new ways of seeing the problem (ibid.). Consequently, it is easier for these students to connect with the learning *process* than the *content,* and they prioritise learning activities that hold potential for collaboration, co-creation and improving social competencies.

Sociability in PBL

The SCs understanding of learning as both collective and problem-oriented corresponds well with the PBL model at AAU (2015). The SCs find the principles of *Group Work* and *Collaboration* especially motivating, because these students prioritise and appreciate activities that allow for the social interaction with fellow students and teachers. They experience positive benefits from group-based learning activities that contribute with knowledge and experiences not attained from, for instance, individual preparation and lectures. However, while group work and collaboration are motivating, it also holds the risk of becoming a source of *amotivation* (Ryan & Deci, 2000, p. 61), since these students are particularly vulnerable to group dynamics and lack of attendance:

"It was not really motivating to attend, because you knew: The others are not going to show up, so who I am going to work with, and I wonder if anybody else is going to be there? Am I going to squeeze in somewhere or just sit and work alone?" (Interview 5).

The SCs vulnerability to social dynamics makes teachers ability to create a socially comfortable learning space important to these students. They expect teachers to *facilitate the process* (Kolmos et al., 2008, p. 37) of the group and ensure good cooperation and discussions rather than give the answers:

"I think it's about giving subtle clues without providing the answer. Because sometimes we are stuck and we don't know which way to go (..) So you just get a little help to get on your way and advice on how to do it well. Not necessarily the answer, because we have to figure that out ourselves." (Interview 7).

THE DIRECTIONLESS EXPLORER (DE)

While some students identify with ideas of future professional selves or the field of study in general, others lack such identifications. Instead, The Directionless Explorers are characterised by random orientation, recurrent doubts, and short-term goals, which shape their experience of PBL environments.

Motivated by expectations

The DEs choice to enter higher education is primarily influenced by societal opinion on the importance of higher education. These students view education as a necessity to do well in life but lack a personal goal or incentive in their choice of study - a possible flipside to these strong societal expectations. Since the DE act according to the (perceived) expectations of others their motivation resembles *introjected regulation* (Deci et al., 1991, p. 329), and they often participate in educational activities, because they believe the educational institution or fellow students expect them to:

"I think you are obligated to attend, because you don't want to just leave it to the others. Then it's just two people sitting there and everyone else didn't show up." (Interview 10)

Like the JPs, they regard the relevance of education in terms of *skills and generalist competencies* (Skardhamar & Baarts, 2016, p. 109). However, rather than ascribing the relevance to *long-term* job goals, they concentrate on *short-term* goals such as a project or passing an impending exam.

"You are always thinking that you just have to get through the next and then the next. (..) I almost think that this is all there is to it. To university. Just exams – from one to the next." (Interview 10)

By way of contrast, students with the characteristics of SE and SC are motivated by the learning *process* - not the *result*. This makes the DE the most externally motivated of the student types and their motivation can even take the form of *external regulation* (Deci et al., 1991, p. 329) as their focus on passing exams lacks a meaningful connection to their sense of self.

The unknown self

While other student types identify with professional, academic or social dimensions of the educational environment, the DEs have not found such identification yet. They may have ended up at their chosen study programme by coincidence, but they entered with the hope of sparking a genuine interest:

"I had imagined that two years in, Sociology would have been my preferred recreational activity. But it's just like high school – it's school and it is work. It can be interesting at times especially if you spend a lot of time with it, but most of the time it's boring to sit and read." (Interview 3)

Since DEs have yet to find this spark, they are continuously searching for something that resonate with them and grabs their attention. As a result, DEs will participate in many different learning activities as they explore the possibilities of self. However, their lack of self-determination and direction makes them susceptible to the influence of others and they are often marked by doubts in their choices.

Learning as necessity

The extrinsic motivation and lack of identification makes it difficult for DE to ascribe purpose and meaning to learning activities. Instead, learning becomes necessary to reach short-term goals and avoid negative consequences such as failing an exam. Subsequently, they judge the importance of learning activities on their connection to exams:

"This is not important to learn, because I'm not going to need it for the exam. Or there is a very small chance, so it is not important to me. (..). So I think exams takes precedence when you are considering whether you're going to participate or not." (Interview 10)

As a result, the DEs perspective on learning resembles *reproductive learning* (Ellström, 1996) since these students understand knowledge in terms of right and wrong answers and prefer repetition between learning activities to test this knowledge. Consequently, they expect teachers to confirm whether the academic content is understood *correctly*, since they find it difficult to make that assessment themselves:

"(..) It can be demotivating when you do not get any response to what you are doing.. It sometimes seems that there is no reason to do it when no one tells you if it is right or wrong." (Interview 10)

Commitment in PBL

The DEs find it hard to navigate in PBL environments and they are prone to *amotivation* (Ryan & Deci, 2000, p. 61) without clear teacher guidance and structured study activities. The DEs find it difficult to live up to the principles of *student responsibility* and *autonomy* in the PBL model (AAU, 2015) because they continuously doubt their own choices and rely on others' expectations to stay motivated. Teachers often play a major role for DEs in terms of *control facilitation* (Kolmos et al., 2008, p. 37). They expect teachers to set clear expectations, correct them if they do not meet these expectations, and explicitly state the purpose of learning activities:

"I miss being told why we do what we do. In general, both with these exercises, lectures, etc. – just in general to be told why it is important." (Interview 10)

For Des the principles of *problem orientation* and *project work* offer the possibility to try out different approaches to problems and explore different subject areas that might spark interest or guide them onwards in their search for identification in the study programme. The social commitment in *group work* can also help them stay motivated, but the lack of personal incentive leaves the DE vulnerable to the whims of fellow students as they look to others for motivation:

"If I knew my group was attending, I would definitely come no matter what it was - just to be a part of it. (..) However, if none of the others come, then it may not be that important. If the others get through without that exercise, I can probably also get through without that exercise." (Interview 10)

STUDENT MOTIVATION AND IDENTITY IN PROBLEM-BASED LEARNING

The increased diversity of the students entering higher education –together with other external demands- challenges the PBL model (Bøje et al., 2020). A more diverse student population means higher demands on the coordinators, teachers and learning environments to insure the outcome of problem-based learning. The four types of students identified in this article - with their distinctly different ways of connecting with and experiencing a PBL environment - indicate that there is no universal way to enhance motivation and identification among students in PBL environments. The typology can serve as a tool to help organizers and teachers understand, examine, and discuss how and why students experience PBL environments differently and which actions should be taken accordingly. In the following, we discuss important considerations for improving PBL environments to support a more diverse student population.

Students identify with PBL in different ways

Students have different ways of identifying with their learning environment (Holmegaard et al., 2012, 2014; Johansson et al., 2020). We find that students may construct identity around the academic, professional, social or even unknown possibilities of higher education. This study adds to the existing literature by highlighting the dual aspect of validation and vulnerability in the different principles of PBL, and the different meaning and importance they have for students' identification. Students, who identify with the academic dimension of PBL, will perceive principles such as group work as an opportunity for challenging academic discussions, while others, who identify with the social dimension, see group work as a chance to develop social competencies. Problem-based learning activities are multidimensional. Therefore, it is important to ensure that

dimensions are balanced when planning PBL activities in order to establish a more inclusive environment. This includes normalizing uncertainty and doubt, and creating opportunities for the students to explore potential areas of identification. Teachers and organizers should include the different ways students identify with their learning environment in evaluations to identify underrepresentation of particular dimensions and gain knowledge of mixed experiences with learning activities. Additional, PBL principles such as group work can be both the source of validation and vulnerability concerning students' identification as seen in the SC's sensitivity to social dynamics. This duality is important to consider when introducing new practices such as workshops or online teaching that may emphasise different dimensions and possibilities for identification. These findings may help to explain the mixed experiences with online teaching during COVID 19 lockdown (Haslam et al. 2021), since the lack of social interactions may have been especially difficult for students with SC characteristics.

The principles in the PBL model motivate students differently

Increasing motivation in PBL environments is no simple task. The typology shows how differences in identification influences students' motivation and experiences with different principles in the PBL model. While some principles greatly motivate certain types of students, they may result in *amotivation* among other types of students. This dual aspect of PBL is important, since any one-sided effort to enhance some PBL-principles at the expense of others may result in *amotivation* among some students. Similarly, Boeskov et al. (2003) find, that efforts, which may help to retain some students can be the cause of dropout for others. This paradox of student diversity is evident in the student types' different views on principles such as autonomy and student responsibility, and how these differences result in different teacher expectations. According to Ellström (1996), a high level of autonomy will enable knowledge-based and reflective learning which are considered key outcomes of PBL. Yet, where some student types look to their teachers for inspiration and guidance, others expect expertise and control. This may explain why other studies find, that PBL not always leads to intrinsic motivation, and the need for finding the right balance between scaffolding and autonomy in PBL environments (Wijnia et al. 2011). To create a more inclusive learning environment, teachers must be able to navigate different roles of facilitation (Kolmos et al., 2008), but also communicate clearly what students can expect and why. This may require extra education in PBL teaching and highlights the dialectic relationship between student characteristics and situational influences in student motivation.

Student types are dynamic and may change over time and in different contexts

We agree with similar studies (Boeskov et al., 2003; Møldrup, 2018) that the different types must be understood as dynamic and not static categories. The typology is a valuable analytical tool for understanding the empirical complexity of student diversity where

student types will exist simultaneously - both in individual students and within student groups – and prominent type characteristics may change over time and contexts. For instance, the directionless characteristic may be more prominent in first year students and towards the last year be replaced by other types such as more job-focused characteristics. Additionally, some student types may be more represented at some studies than others. Students' construction of identity is an ongoing process and something that study programmes can support (Holmegaard et al. 2014). Organizing PBL activities accordingly, could help students in this process. However, doubts may also occur - and eventually result in dropout - if students feel they do not match the assumptions that constitutes 'the ideal student' in their learning environment (Sarauw & Frederiksen, 2020). Though PBL may offer a more inclusive learning environment in higher education, it is necessary for teachers and organizations to acknowledge how not just higher education but also *PBL* environments shape and favour certain types among students. As Boeskov et al. (2003) argues, higher education environments risk losing otherwise gifted students if they choose to focus their effort on a single student type. Creating a more inclusive PBL environment involves active discussions among faculty on diversity in ideas of 'the ideal PBL student' and making sure this diversity is communicated to students both explicitly and through the organization of PBL activities that accommodates different student types. However, further research is also needed to help support this effort.

LIMITATIONS

The typology was developed using qualitative methods based on participant observation and 10 semi-structured interviews with students from 3rd, 4th and 6th semester in Sociology at AAU. First year students might have provided more insight into the doubts of the directionless explorer, as we expect this type to be more prominent in the early transition into higher education. However, later semesters where selected as they were expected to provide more well-defined student types and more well-established identifications with the study programme. We conducted interviews with students who –with variations- regularly or always participated in the workshops. The analysis does not include students who seldom or never participate, and we are unable to say whether they share the characteristic of those who attend workshops. However, among the interviewed students we were able to identify both motivation and amotivation. This specific typology may be limited to Sociology and similar disciplines, where there is no clear and well-defined professional profile for students to identify with. However, the student types identified in this article resembles types found in other studies across different courses, study programmes and universities. The main part of the interviewed students are women, which reflects the gender distribution at the Sociology programme. However, the unequal representation of gender is a limitation in the generalization to student populations with

a different gender distribution. Lastly, we conducted the study at AAU with a learning environment based on the principles in the AAU PBL model. The principles in this model may vary compared to other PBL environments.

CONCLUSION

In this article, we offer a new typology of student types considering not only differences in student motivation and identification with their study programme, but also how this tie into different ways of understanding learning and experiencing PBL environments. The four theoretical types identified have distinctly different ways of connecting with and experiencing PBL environments. These types are: 1) The Job-Focused Practitioner, 2) The Subject-Enthusiast, 3) The Social Collaborator, and 4) The Directionless Explorer. The student types identified in this article bare some resemblances with other types identified by related studies, which indicates similar diversity in the student population across different courses, study programmes and universities. This article adds to the existing PBL literature by highlighting the dualism of PBL as source of both motivation and amotivation; validation and vulnerability. The typology offers a way of understanding student diversity beyond the distinction between ´academic´ and ´non-academic´ (Biggs & Tang 2007) or ´traditional´ and ´non-traditional´ students (Gilardi & Guglielmetti, 2011). Instead, we contribute to a more dynamic and situational perspective where teachers, fellow students and the PBL environment are co-creators of students' motivation and identification.

In the discussion, we highlight three important aspects of student diversity for teachers and organizers to consider: 1) Students identify with PBL in different ways. They may identify with the academic, professional, social, or even unknown possibilities of higher education or a mix of these. This multidimensional aspect should be considered to accommodate different meaningful ways of identifying with PBL environments. 2) The principles in PBL motivate students differently, and the same principle may cause amotivation in some students while enhancing motivation in others. Teachers and organizers should consider this when evaluating and improving PBL practices to avoid any one-sided efforts to enhance some principle over others. 3) Student types are dynamic. Students may have multiple type characteristics, and they may change over time and in different contexts. Future research should focus on how PBL environments cultivate and possibly idealise certain student types over others.

References

AAU Aalborg University. (2015). PBL – Problem-Based Learning. Aalborg University. Retrieved 04-04-2021 from: https://www.aau.dk/digitalAssets/148/148025_pbl-aalborg-model_uk.pdf

Antoft, R., & Salomonsen, R. H. (2007). Det kvalitative casestudium – introduktion til en forskningsstrategi [In Danish. The Qualitative Case Study – An Introduction to a Research Strategy]. In Antoft et al.(eds.), *Håndværk & Horisonter – Tradition og nytænkning i kvalitativ metode* [In Danish. *Craft and Horizons – Tradition and New Developments in Qualitative Methods*] (pp. 29-57). Syddansk Universitetsforlag.

Antonio, A. L., & Muñiz, M. M. (2007). The Sociology of Diversity. In Gumport, P. J. (ed.): *Sociology of Higher Education – Contributions and Their Context* (pp. 266-294). The John Hopkins University Press.

Bailey, K. D. (1994). *Quantitative Applications in the Social Sciences: Typologies and taxonomies.* SAGE Publications, Inc. DOI: 10.4135/9781412986397

Biggs, J., & Tang, C. (2007). *Teaching for Quality Learning at University*. (Third Edition). McGraw Hill/Open University Press.

Boeskov, S., Dannesboe, K., Larsen, M. K., Olsen, N. F., Sørensen, P. H., & Sørensen, I. (2003). Det gode studieliv – en kvalitativ undersøgelse af studiemønstre, studieskift og frafald ved Det Humanistiske Fakultet på Københavns Universitet [In Danish. The Good Student Life. A Qualitative Examination of Study patterns, Study Change and Drop-Out at The Faculty of Humanities at University of Copenhagen], University of Copenhagen. Retrieved 04-04-2021 from: https://hum.ku.dk/omfakultetet/statistik_og_tal/detgodestudieliv2003.pdf

Bøje, J., Elle, B., & Larsen, L. (2020). Nye udfordringer på universitetet -pædagogik mellem lyst og nødvendighed [In Danish. *New Challenges at the University – Pedagogy between Pleasure and Necessity*]. *Dansk Pædagogiske Tidsskrift*, *1*, 5-8. Retrieved 04-04-2021 from: https://dpt.dk/temanumre/2020-1/redaktionel-indledning/

Caspersen, J., Hovdhaugen, E., & Karlsen, H. (2012). Ulikhet i høyere utdanning: En litteraturgjennomgang for perioden 2002-2012 [In Norwegian. Inequality in higher education: A literature review of the period 2002-2012]. Nordisk Institutt for studier av innovasjon, forskning og utdanning (NIFU) Retrieved 04-04-2021 from: https://www.nifu.no/publications/952185/

Chang, M. J. (2013). Post-Fischer: The Unfinished Research Agenda on Student Diversity in Higher Education. *Educational Researcher, 42* (3), 172-173. DOI: 10.3102/0013189X13486764

Deci, E., Vallerand, L., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and Education: The Self-Determination Perspective. *Educational Psychologist, 26* (3-4), 325-346. DOI: 10.1080/00461520.1991.9653137

Ellström, P. (1996). Rutin och reflektion: Förutsättningar och hinder för lärande i dagligt arbete [In Swedish. Routines and Reflection: Requisites and Barriers of Workplace Learning], in P. Ellström, B. Gustavsson, & S. Larsson (eds.) *Livslångt lärande* (pp. 142-162). Studentlitteratur.

Engen, M., Fallov, M. A., Jensen, R. H. S., Jensen, J. B., & Ravn, O. (2017). PBL og de sammensatte hold på kandidatuddannelser: "When the going gets tough, PBL gets going!" [In Danish. PBL and Mixed Courses at Master Programmes: When the going gets tough, PBL gets going!]. Department of Sociology & Social Work, Aalborg University. Retrieved 04-04-2021 from: http://vbn.aau.dk/da/publications/pbl-og-de-sammensatte-hold-paa-kandidatuddannelser(370c3109-d096-47df-bf04-ce5c65068323).html

Engen, M., Fallov, M. A., Jensen, R. H. Skaarup, Jensen, J. B. & Ravn, O. (2018). PBL and Mixed-Background Groups on Master's Programmes. *Journal of Problem Based Learning in Higher Education, 6* (2), 71-90. DOI: 10.5278/ojs.jpblhe.v6i2.2193

Flyvbjerg B. (2006). Five Misunderstandings about Case-Study Research, *Qualitative Inquiry, 12* (2), 219-245. DOI: 10.1177/1077800405284363

Gilardi, S., & Guglielmetti, C. (2011). University Life of Non-Traditional Students: Engagement Styles and Impact on Attrition, *Journal of Higher Education, 82* (1) 33-53. DOI: 10.1080/00221546.2011.11779084

Haslam, C. R., Madsen, S., & Agger Nielsen, J. (2021). Problem based learning during the COVID 19 pandemic. Can project groups save the day? *Communications of the Association for Information Systems*, 48, 161-168. DOI: 10.17705/1CAIS.04821

Holmegaard, H. T., Madsen, L. M., & Ulriksen, L. (2012). To Choose or Not to Choose Science: Constructions of Desirable Identities among Young People considering a STEM Higher Education Programme. *International Journal of Science Education*, 1–30. DOI: 10.1080/09500693.2012.749362

Holmegaard, H., Madsen, L., & Ulriksen, L. (2014). A Journey of Negotiation and Belonging Understanding Students' Transitions to Science and Engineering in Higher Education, *Cultural Studies of Science Education, 9*, 755-786. DOI: 10.1007/s11422-013-9542-3

Højberg, K., & Martinussen, M. (2015). Er jeg akademiker nok? – studenterkampe om legitim uddannelseskultur [In Danish. Am I Academic Enough? Student Struggles For Legitimate Study Culture], *Dansk Universitetspædagogiske Tidsskrift, 10* (18), 7-24. Retrieved 04-04-2021 from: https://tidsskrift.dk/dut/article/view/15860

Jacobsen, M. H. (2007). Adaptiv teori - den tredje vej til viden: en stående invitation til syntesesociologi [In Danish. Adaptive Theory – The Third Way to Knowledge. An Invitation to Synthesis in Sociology]. In M. H. Jacobsen, R. Antoft, S. Kristiansen & A. Jørgensen (eds.), *Håndværk og horisonter: tradition og nytænkning i kvalitativ metode* [In Danish. *Craft and Horizons – Tradition and*

New Developments in Qualitative Methods] (pp. 249-291), Syddansk Universitetsforlag.

Jenkins, R. (2006). *Social identitet* [In Danish. *Social Identity*]. Hans Reitzels Forlag.

Johannsen, B. F., Ulriksen, L., & Holmegaard, H. T. (2013). Deltagerforudsætninger [In Danish. Required Skills for Participation], in L. Reinecker, P. S. Jørgensen, J. Dolin, & G. H. Ingerslev (eds.) *Universitetspædagogik* (pp. 115-132). Samfundslitteratur.

Johansson, N., Nøhr, S. B., & Stentoft, D. (2020). A Scoping Review of the Relation between Problem-Based Learning and Professional Identity Development in Medical Education. *Journal of Problem Based Learning in Higher Educatio*n, *8* (2), 25-41. DOI: 10.5278/ojs.jpblhe.v8i2.3554

Khan, M. A. A., & Sobani, Z. A. (2012). Influence of Gender and Ethnicity on Problem-Based Learning. *Journal of Pioneering Medical Science*, *2* (3), 122-125. DOI: 10.1002/j.2168- 9830.2011.tb00013.x

Kolmos, A., Du, X., Holgaard, J. E., & Jensen, L. P. (2008). Facilitation in a PBL Environment. UCPBL UNESCO Chair in Problem Based Learning. Retrieved 04-04-2020 from: https://vbn.aau.dk/da/publications/facilitation-in-a-pbl-environment

Krogh, L., & Jensen, A. (2020). Unge med trivselsproblemer i kollaborative fællesskaber [In Danish. Young Students with Low Degree of Wellbeing in Collaborative Communities], *Dansk Pædagogisk Tidsskrift,* 1, 64-75. Retrieved 04-04-2021 from: https://dpt.dk/temanumre/2020-1/unge-med-trivselsproblemer-i-kollaborative-laeringsfaellesskaber-i-videregaaende-uddannelse/

Krogh, L., & Wiberg, M. (2013). Problemorienteret og projektorganiseret undervisning. [In Danish. Problem-Orientation and Project-Based Teaching]. In L. Rienecker, P. S. Jørgensen, J. Dolin, & G. H. Ingerslev (red.): *Universitetspædagogik*, (pp. 215-227). Samfundslitteratur.

Kyed, M., & Pedersen, L. M. (2016). Gruppebaserede øvelser: en empirisk analyse af muligheder og udfordringer. [In Danish. Group-Based Workshops: An Empirical Analysis of Possibilities and Challenges]. *Danmarks Universitetspædagogisk Tidsskrift, 11*(21), 1-13. Retrieved 04-04-2021 from: https://tidsskrift.dk/dut/article/view/23352

Layder, D. (1998). *Sociological Practice – linking theory and social research*. Sage. DOI: 10.4135/9781849209946

Langholz, M. (2014). The Management of Diversity in U.S. and German Higher Education, *Management Revue, 25*(3), 207-226. DOI: 10.1688/mrev-2014-03-Langholz

McDonough, P. M., & Fann, A. J. (2007). The Study of Inequality. In P. J. Gumport (ed.), *Sociology of Higher Education – Contributions and Their Context* (pp. 53-93)*,* John Hopkins University Press.

Møldrup, A. L. (2018). Frafald og fastholdelse af førsteårsstuderende på Det Humanistiske Fakultet, Aalborg Universitet [In Danish. Dropout and Study Retention of First Year Students at The Faculty of Humanities at Aalborg University], Aalborg University. Retrieved 04-04-2020 from: https://vbn.aau.dk/en/publications/frafald-og-fastholdelse-af-f%C3%B8rste%C3%A5rsstuderende-p%C3%A5-det-humanistisk

Pedersen, L. M., Thomassen, A. O., & Buus, K. (2018). Afslutningsrapport for Videreudvikling af PBL-undervisningen i rummet mellem forelæsninger og projektarbejdet [In Danish. Development of Problem-Based Learning in Group-Based Exercises. Final report]. Internal report at Aalborg University. Retrieved 04-04-2020 from: http://vbn.aau.dk/en/projects/videreudvikling-af-pblundervisning-i-rummet-mellem-forelaesninger-og-projektarbejde(6236fab7-116f-4725-8304-97b6a288e6cc).html

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology, 25*, 54–67. DOI: 10.1006/ceps.1999.1020

Sarauw, L. L., & Frederiksen, J. T. (2020). Universitetet som Plan B - Studietvivl som copingstrategi blandt universitetsstuderende [In Danish: University as Plan B – Study Doubts as a Coping Strategy among University Students]. *Dansk Pædagogiske Tidsskrift*, *1*, 23-34. Retrieved 04-04-2021 from: https://dpt.dk/temanumre/2020-1/universitetet-som-plan-b/

Skardhamar, L. P., & Baarts, C. (2016). Universitetsuddannelsens relevans i samfundsvidenskabelige studerendes perspektiv [In Danish. The relevance of university according to social science students]. *Dansk Universitetspædagogisk Tidsskrift*, *11*(20), 104-112. Retrieved 04-04-2021 from: https://tidsskrift.dk/dut/article/view/22066

Søndergaard, D.M. (1996). *Tegnet på kroppen* [In Danish. *The sign on the body*]. Museum Tusculanums Forlag.

Taylor, I., & Burgess, H. (1998). Responding to 'Non-Traditional' Students: An Enquiry and Action Approach. In D. Boud & G. Feletti (eds.) *The Challenge of Problem-Based Learning,* (2nd ed., pp. 103-116), Psychology Press. DOI: 10.4324/9781315042039

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality Health Care. 19*(6), 349-357. DOI: 10.1093/intqhc/mzm042

Thomsen, J. P. (2010). Klasse og kultur på danske universitetsuddannelser [In Danish. Class and Culture at Danish Universities]. *Dansk Sociologi, 21*(1), 53-73. DOI: 10.22439/dansoc.v21i1.3195

Ulriksen, L. (2009). The Implied Student, *Studies in Higher Education, 34* (5), 517-532. DOI: 10.1080/03075070802597135

UKRVU (Udvalg for Kvalitet og Relevans i de Videregående Uddannelse). (2015). Nye veje og Høje mål - Kvalitetsudvalgets samlede forslag til reform af de videregående uddannelser. [In Danish: New Roads and High Goals - Proposals from The Expert Committee on Quality in Higher Education]. Ministry of Higher Education and Science, Denmark. Retrieved 04-04-2020 from: http://ufm.dk/uddannelse-og-institutioner/rad-naevn-og-udvalg/kvalitetsudvalget/publikationer%20

Wijnia, L., Loyens, S. M. M., & Derous, E. (2011). Investigating Effects of Problem-Based versus Lecture-Based Learning Environments on Student Motivation, *Contemporary Educational Psychology, 36* (2), 101-113. DOI: 10.1016/j.cedpsych.2010.11.003