Teaching, Learning and the Profession

Monitoring Generic Skills Development in a Bachelor European Studies

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Abstract

To ensure a smooth transition from studies to professional careers, students' skills and attitudes are often considered of greater value than theoretical knowledge and understanding. Yet, whereas typical academic skills such as research and writing are commonly monitored and trained, generic skills such as teamwork and communication receive scant attention. At Maastricht University, we developed a portfolio to raise awareness about skills required to take full advantage of the Problem-Based Learning environment, and to initiate self-reflection by students. As such, the portfolio also provides an opportunity to engage in a more in-depth assessment of students' skills acquisition. Students assessed their skills at the start of the bachelor programme through a survey that was administered again at two later stages during the first year. Comparing data of 414 students, we provide a unique insight into skills progression in an active learning environment. Repeated measures can thus provide a first impression of the impact of an active learning environment on generic skills acquisition. While we argue that the current portfolio achieves its educational objectives, as an instrument for measurement of skills acquisition it has its limitations.

Keywords

National and European policy-makers have put skills high on the agenda of Higher Education (HE). Skills, including research skills needed to continue an academic career, have always been an important component of HE. The explicit focus is, however, increasingly on the 'generic' skills that students require to make a smooth transition into the labour market. This development has been pushed both by the European Commission, through, for instance, the New Skills Agenda launched in 2016, and by the inter-governmental Bologna process that made 'employability' a main goal of the European Higher Education Area (EHEA)[1]. In the context of mass higher education, increased competition among HE institutions, youth unemployment, and fast-changing demands of the modern global economy, it is only natural that HE started to pay more attention to students' acquisition of generic skills to ensure employability.

The concept of employability is not without its critics (for a discussion see Clark and Martin 2016), but it has triggered a fruitful exchange about the identification, teaching and learning of relevant skills in HE programmes. Since then, extensive debates have ensued on the definition and identification of relevant employability skills (Suleman 2017), the responsibility of HE institutions in providing such training (Sin and Neave 2016), and the integration of these skills in university programmes (Lee, Foster and Snaith 2016).

In contrast to the extensive range of ways to assess and evaluate different types of knowledge and academic skills, tools to evaluate students' generic skills are far less developed. This is despite the existence of work that has looked at graduates' self-reported skills development in different learning environments (Vaatstra and De Vries 2007; Schmidt and van der Molen 2001; Knipprath 2017). In

the social sciences, teaching practice has already adjusted by incorporating simulations (Bursens, Donche, Gijbels and Spooren 2018), classroom debates (Oros 2007), and the use of work placement (Crebert et al. 2004) in curricula. While these are steps in the right direction, they also raise questions about the proper monitoring of students' generic skills development. Can students revise their learning strategies or study programme based on the evaluation and feedback obtained? Is there also scope for reflection and repeated learning? Perhaps too often, skills training is isolated in a separate course, simulation or internship (see Wingate 2006).

This article engages with these questions by focusing on the use of an online portfolio as part of students' mentoring programme at Maastricht University's Bachelor in European Studies (BA ES). Portfolios in HE usually consist of work that illustrates a student's development and progress (Slepcevic-Zach and Stock 2018: 2-4). One of the aims of the portfolio used in the BA ES is to raise awareness about skills required to take full advantage of the Problem-Based Learning (PBL) environment that applies across the university. PBL is a student-centred approach to learning, based on active construction of knowledge in the context of specific problems. Learning takes place in small groups guided by a tutor, who acts as a facilitator rather than a lecturer (Maurer 2015). Another aim of the portfolio is to support students' self-reflection. As such, the portfolio provides an opportunity to engage in a more in-depth evaluation of students' skills acquisition.

To explore the suitability of this portfolio as a tool to monitor generic skills development, the article proceeds in four sections. In the first section, we situate our research within the broader literature. The second section discusses the creation and content of the portfolio. It also provides a first insight into the structure of the questionnaire described and analysed in the third section. The fourth section adopts a critical perspective and re-assesses the original instrument, proposing revisions for future use. We conclude by reflecting on the challenge of combining the educational purposes of the portfolio with the development of an objective instrument for the measurement of skills acquisition.

SKILLS AND MAPPING THEIR PROGRESSION

Much of the debate about skills acquisition concerns the concept of 'employability' and its implications. Clark and Martin (2016), for example, argue that particularly in the UK the employability agenda has been driven by government policies, national student surveys, concerns of parents and students faced with high tuition fees, and the Bologna process (see also Lee et al. 2016). As Sin and Neave (2016) show, European policy-makers and employers have promoted a discourse that stresses students' need to become 'employable' individuals, and emphasises the responsibility of HE institutions to equip students with the necessary skills to do so (see also Crebert et al. 2004, on Australia; Mohan et al. 2010, on the United States).

Given these pressures on HE institutions, scholars have looked into two related questions. First, what are the 'employability skills' that students need to acquire? There is some recognition that these skills may be different depending on the discipline that students are trained in. Dunne, Bennett and Carré (2000: 108-109), for example, differentiate between skills that are central to a particular discipline and skills that are not discipline-specific. In the employability debate, the focus has by and large been on the latter type of skills – usually based on the argument that these have become crucial in a globalising environment with fast-changing technologies (Shuman, Besterfield-Sacre and McGourty 2005: 42-44).

Nevertheless, as Suleman (2017: 2) points out, the conceptualisation and identification of what such generic skills are is 'far from straightforward'. She finds that scholars have used methods ranging from inductive analyses of job advertisements or interviews with employers, to studies of the

importance of a particular pre-defined skill or set of skills. Three sets of skills are usually mentioned: 'relational skills', such as communication and teamwork skills; 'cognitive skills', such as analytical and critical thinking, learning abilities and organising and planning skills; and 'technical skills' such as IT skills. These skills are echoed in studies that survey graduates (Schmidt and Van der Molen 2001) as well as enrolled students (Badcock, Pattison and Harris 2010). Dunne et al. (2000: 111) also identify four similar areas of generic skills: 'management of self', including learning abilities; of 'others', including group work; of 'task', including conceptualisation; and of 'information', including IT and critical use of information.

This identification of generic skills leads to the second question, namely, how can these skills best be taught? Here, there seems to be some tension between the teaching of disciplinary and generic skills, both when it comes to the attitude of staff towards the teaching of the latter skills (Díaz, Santaolalla and González 2010), and to the design of programme curricula (Dunne et al. 2000: 109-110; Drummond, Nixon and Wiltshire 1998). That is, HE programmes are usually organised within a particular discipline, so that generic skills need to be taught in the context of a discipline-oriented programme. For this reason, some scholars discuss the introduction of courses dedicated to the teaching of skills in curricula, ranging from generic skills in engineering (Mohan et al. 2010; see also Shuman et al. 2005), to teamwork in programming (Sancho-Thomas, Fuentes-Fernández and Fernández-Manjón 2009), and intellectual skills in political science (Clark 2011).

Many scholars have made a case for a comprehensive approach to teaching generic skills. Wingate (2006: 459) argues that extra-curricular courses on study skills like time management and note taking 'divorce' skills from subject knowledge. Effective training rather requires a 'built-in' approach, in which skills are embedded in the entire programme (see also Drummond et al. 1998). As Wingate (2006: 465) writes, a built-in approach 'recognize[s] (a) the complexity of the learning involved and the time needed for it; and (b) the relevance of the skills beyond university.' There are some good examples of this comprehensive approach in the literature. Atlay and Harris (2000), for instance, find that extensive discussions with the community both in- and outside the university were key to the successful introduction of a university-wide skills template at the University of Luton. It also required the re-thinking and re-structuring of all modules offered at the university, in order to make explicit the 'skills embedded within them' (78). In a study of European Studies programmes in Maastricht and Newcastle, Maurer and Mawdsley (2014: 40) also show how 'both universities attempt to increasingly combine academic knowledge transfer […] with the training in transferable skills'.

Arguably, such a comprehensive approach to teaching generic skills is especially important in the social sciences, where students are usually not trained in a particular profession (Clark and Martin 2016), and where 'critical engagement with […] the social world' is central to curricula (Lee et al. 2016: 108). Maurer and Mawdsley (2014: 39) find that programmes about policies and politics are also 'well-suited' for a comprehensive approach to the teaching of skills, as 'engagement with the policy environment is already embedded in mainstream understandings of how to teach the subject'. While the implementation of this approach may be difficult (Wingate 2006: 467; Drummond et al. 1998: 21; Adriaensen, Coremans and Slootmaeckers 2014: 261-262), it may be facilitated by an active learning environment in which students synthesise, evaluate, apply, and critically reflect upon course material in tutorial group discussions (Clark 2011: 136).

Yet academic attention to employability, its associated skills, and its integration in teaching programmes is not necessarily accompanied by attention to skills evaluation and development. Indeed, neither measurement nor assessment of generic skills is an easy task (Atlay and Harris 2000: 78-89). Scholars have looked at graduates' self-reported effects of skills development in different learning environments (Vaatstra and De Vries 2007; Schmidt and van der Molen 2001; Knipprath 2017). However, there are only a few examples of surveys that look at students' perceived gains in

skills after a particular course in their studies (Sancho-Thomas et al. 2009; Mohan et al. 2010). Clark (2011), for example, reports that students gained more confidence with skills in a political science research methods course that integrated some generic skills, such as teamwork and presentation.

Such approaches to the evaluation of skills progression are, however, rather isolated – with little attention to repeated or continuous learning. In a more comprehensive approach, Badcock et al. (2010) study – amongst other questions – the effect of years of university experience on students' performance in the Australian Graduate Skills Assessment test. They found only 'limited evidence that students in their later years of study demonstrated higher skill levels when compared with students in their earlier years of study' (454), with the exception of problem-solving skills. However, as they recognise themselves, the cross-sectional design of the study 'may be susceptible to cohort effects', and thus provides only limited information about individual students' skills progression over the course of their studies (Badcock et al. 2010: 454).

To conclude, there is only limited knowledge about students' gradual skills progression throughout their studies. Moreover, evaluations based only on surveys may have the disadvantage of providing little opportunity for students to reflect on their learning trajectory and adapt accordingly. As we set out below, a portfolio that tracks students' learning over time may address these challenges

THE SKILLS PORTFOLIO IN MAASTRICHT'S BA EUROPEAN STUDIES

Maastricht University's BA ES is a three-year, English-taught interdisciplinary programme. The programme attracts a diverse, international group of students, representing over 30 nationalities. Content-wise, the BA ES is concerned with the analysis of cultural, economic, legal, political and social issues related to Europe in its widest sense. Its approach resembles what Rumford (2009: 3) describes as the core focus of European Studies, namely 'to explore its [Europe's] multiple constructions, meanings, histories, and geographies'. Despite calls for a 'core curriculum' the field of European Studies does not come with one clear framework (cf. Rumford and Murray 2003). Whereas some programmes focus on the European Union (EU), others resemble more traditional Area Studies programmes (Rosamond 2007; Calhoun 2003). One of the points that constantly surfaces in the debate, is the – sometimes contested – interdisciplinary nature of European Studies and the benefits of such an interdisciplinary approach for understanding European developments (Rumford and Murray 2003; David, Drake and Linnemann 2017).

The debate about the focus and nature of European Studies, however, often concerns European Studies as a research field, rather than as a field of student learning (cf. Rittberger and Blauberger 2018). While this is less problematic in terms of general focus, it does raise questions regarding skills attainment: what are the skills students in European Studies (need to) acquire during their studies? Because European Studies is an interdisciplinary programme that is non-vocational by nature, a clear-cut differentiation between core (discipline-specific) and generic (cross-disciplinary) skills is difficult to make. Indeed, some skills that may be considered generic in some disciplines are core to the social sciences, including communication skills, critical thinking and analytical skills (see Lee et al. 2016: 108; Clark and Martin 2016).

In Maastricht University's BA ES, some skills are explicitly made part of the curriculum – either as part of content courses or as part of the 'skills track' that runs alongside content courses. These include skills mentioned in the European Studies literature, such as foreign language skills (Smith 2003) and the ability to understand and analyse the practice of politics and policy-making (Maurer and Mawdsley 2014). They also include academic research and writing skills, skills in qualitative and quantitative methods, and negotiation skills.

Generic skills are a more implicit part of the programme with no dedicated courses or skills tracks developed for their training. While this characteristic is common among European Studies programmes elsewhere, the major characteristic distinguishing the BA ES from other programmes, is its commitment to PBL across the curriculum (Timus, Cebotari and Hosein 2016). In fact, broadly speaking there are very few programmes in European Studies and similar programmes in International Relations and Politics that are (partly) taught in line with the principles of PBL (Craig and Hale 2008). One consequence of this reliance on PBL is the training of generic skills (Maurer and Mawdsley 2014).

Generic skills required and trained in a PBL environment

PBL revolves around four key principles that are especially apt for learning in an interdisciplinary environment: constructive, collaborative, contextual and self-directed. Learning is an active process in which knowledge and meaning are (re-)constructed through interaction between and collaboration with fellow students. The context is set by practical and theoretical 'problems', which serve as a starting point for the learning process. Working in small groups, students direct the learning process by contributing existing knowledge and deciding on how to address these problems (Dolmans, De Grave, Wolfhagen and Van Der Vleuten 2005).

Many of the skills central to a PBL environment are also appreciated in a professional working environment: ranging from more basic skills such as being on time and raising questions, to more advanced skills like realising a productive, collaborative atmosphere. Moreover, students take up different roles during tutorial sessions, including discussion leader and whiteboard worker. Clearly, such roles and skills also matter in working environments. As Clark (2011: 138) writes, 'working in teams is a standard practice in most employment situations'. In fact, Drohan, Mauffette and Allard (2011) call generic skills a 'by-product' of PBL. While the evidence is not always clear-cut (see Knipprath 2017), there is research that suggests that graduates who studied in a PBL learning environment have developed better generic competences (Vaatstra and De Vries 2007; Schmidt and van der Molen 2001).

In Maastricht, the learning process is structured through the so-called seven steps (see Table 1), which mimic the research process (Maurer 2015: 371-372): students start with a puzzle, determine what they know and what they do not know about the topic, and develop one or more research questions to guide their research. To answer the questions and arrive at a conclusion, they consult different sources. Together, the first five steps form the so-called pre-discussion. Here, students determine gaps in their knowledge and devise a research strategy. The sixth step, the self-study phase, usually takes two days during which students study the material. They report back during the so-called post-discussion. Throughout these seven steps, students continuously practice generic skills. This makes active learning, in general, and PBL, in particular, different from other learning settings such as traditional lecture-based programmes (see also Clark 2011).

The skills portfolio that was designed as part of the BA ES mentor programme (see below) identifies five main sets of skills: communication skills, analytical skills, teamwork, time-management skills and professional attitude – each subdivided in six to ten statements (see Tables 2 to 6 below). The skills identified in the portfolio are amongst those mentioned in the academic literature on the development of generic skills in HE discussed above. First, students need to develop good *communication skills*. Being able to clearly communicate with and listen to fellow students is of utmost importance in a collaborative learning environment. This concerns asking questions, making contributions and discussing the material. Particularly in the role of discussion leader, students also

need to be able to summarise arguments and reflect on them. The student working at the whiteboard or taking notes needs to be able to succinctly summarise on-going discussions.

Table 1. Maastricht University's PBL seven steps

1. Clarification of terms and concepts
2. Defining the problem statement
3. Brainstorm using prior knowledge and common sense
4. Structuring of the brainstorm through constructing a detailed and coherent   'theory'
5. Formulation of learning objectives for self-directed learning
6. Self-study to fill the gaps in knowledge
7. Post-discussion to integrate acquired knowledge in a suitable explanation

See also the video 'Problem-Based Learning at Maastricht University', Online: https://www.youtube.com/watch?v=cMtLXXf9Sko [accessed 17 January 2019].

Second, while research skills are an explicit part of the BA ES programme – many students end up in jobs that require them to do research (cf. Lightfoot 2012: 199-200) – PBL also mimics the research process and a key element of becoming a good researcher is developing more generic *analytical skills*. This requires critical engagement with the problem, drafting clear learning objectives and in-depth reading of the material to be studied, but also thorough discussion in the group.

Third, PBL is a collaborative learning process. Students thus need to develop skills related to *teamwork*. That is, only by working together with their peers, will students achieve a better understanding of the problems. This requires the ability to share knowledge with the group and to allow others to do so as well, but also an ability to critically reflect on the group process. The discussion leader plays a key role in making sure that the group functions well, by creating a space for open debate and by inviting students to contribute.

Fourth, *time management* is important throughout. Each group meeting lasts two hours, with two days in between for self-study. During the first half of a tutorial, students report what they read with the aim of achieving a better understanding of the problem. A structured and well-managed discussion is key to answering the learning objectives raised previously. The second part of the meeting is devoted to the pre-discussion of a new problem. Being able to formulate good learning objectives requires a proper brainstorm (steps 3 and 4 in Table 1) instead of a rushed, superficial discussion. Finally, during the self-study phase students benefit from good time-management skills and the ability to work on their own to get to grips with the material necessary for answering the learning objectives.

Fifth and finally, in addition to general skills related to working in a team, students are expected to show a *professional attitude* towards their group members and teaching staff. This includes, for example, showing courtesy to fellow students, but also informing a tutor in case of absence. Groups change every four to eight weeks, so that students experience working with different people. Roles change too, with a new discussion leader, whiteboard worker and note-taker for every session or problem. This promotes students' professional ability to work in a broad range of dynamic settings (Sancho-Thomas et al. 2009: 523).

Motives behind the portfolio

The skills portfolio that is the subject of this study was designed as part of the BA ES mentor programme. To support students' transition to university, the BA ES introduced a mentor programme in 2011 simultaneously with Matching, which is an intake process aimed at helping prospective students make their study choice (Bijsmans and Harbers 2014). Research into early

examples of Matching had shown that it is most effective when complemented by a dedicated mentor programme (Verbeek, van Eck and Glaudé 2011). Generally, literature on first-year experience in HE stresses the importance of guiding students into academia. These ideas were considered when designing the mentor programme (Brahm, Jenert and Wagner 2017).

Initially, the idea was to set up a system in which students would regularly meet their mentor – a member of the teaching staff – throughout the full three years of their studies. However, it soon became clear that practical obstacles such as the availability of staff made a three-year programme unrealistic. Consequently, it was decided to focus on individual mentoring in the first year, which is generally seen as the most important year in HE (Jansen, Suhre and André 2017; Brahm et al. 2017). During the second and third years, mentoring takes a broader approach, for instance by organising group sessions on internship opportunities and pitching.

From the start, the BA ES has experimented with different types of meetings and several iterations of the portfolio, including an e-portfolio that came with numerous technical obstacles. As far as the meetings are concerned, since the academic year 2017/2018, the first two 1½-hour group sessions take place during the programme's introduction days. Set up in accordance with PBL philosophy, mentor groups of about 12 students discuss an assignment text that raises questions about issues related to the transition from high school to university, but also covers issues regarding programme content and students' future learning environment. After these meetings, students continue to meet their mentor on an individual basis during three scheduled 30-minute sessions, while more sessions may be planned depending on individual needs.

The BA ES portfolio serves as a means for students to reflect on their learning process, but also as input for their mentor meetings. As the aim is to support students in their first year of studies, the emphasis of the portfolio is mostly on those skills that are necessary for further learning (see also Atlay and Harris 2000: 77-78). The portfolio consists of three core elements, which have been embedded into the online survey tool Qualtrics in autumn 2017. By moving from a paper-based to a web-based portfolio, it was hoped to strengthen engagement with the portfolio (cf. Driessen, Muijtjens, Van Tartwijk and Van Der Vleuten 2007).

The first part of the portfolio consists of a number of open questions on study choice, motivation and expectations, and challenges and experience related to programme content and learning environment. For the first meeting, these questions relate back to the Matching questionnaire that students complete upon application to the programme. As the year progresses – an academic year consists of five periods – the questions are adapted to reflect students' development and experience.

The second part of the portfolio consists of a self-score card for students to reflect on the key PBL-related generic skills discussed above. This part was already tested within the Qualtrics environment in 2015-2016. Lähteenmäki and Uhlin (2011: 154-155) call portfolios a 'powerful tool' to stimulate continuous reflection on PBL and generic skills development. In addition, many new students are not accustomed to self-directed learning and working in groups, hence it is important to introduce them to and have them reflect on what it takes to make a PBL-tutorial a success (Peterson 1997). This specific part of the portfolio is the focus of our empirical analysis.

The final part of the portfolio is aimed at the further development of skills. Students are asked to reflect on their objectives, the way in which they are going to achieve them, where and when, and who they might ask for help. The university's student psychologists, who also provide the annual training session for mentors, designed this part. The focus of this training session is predominantly

on the third part of the portfolio, but the trained mentoring skills, such as how to ask good questions, are relevant for the entire portfolio and mentor programme.

Portfolio, reflection and skills progression

The inclusion of a PBL self-score card in the portfolio serves a dual purpose. On the one hand, it signals the skills expected in HE, in general, and in a PBL environment, in particular; on the other hand, it provides some concrete measures that enable reflection and self-directed learning by the students. Mentors can also use this information to further support students' development.
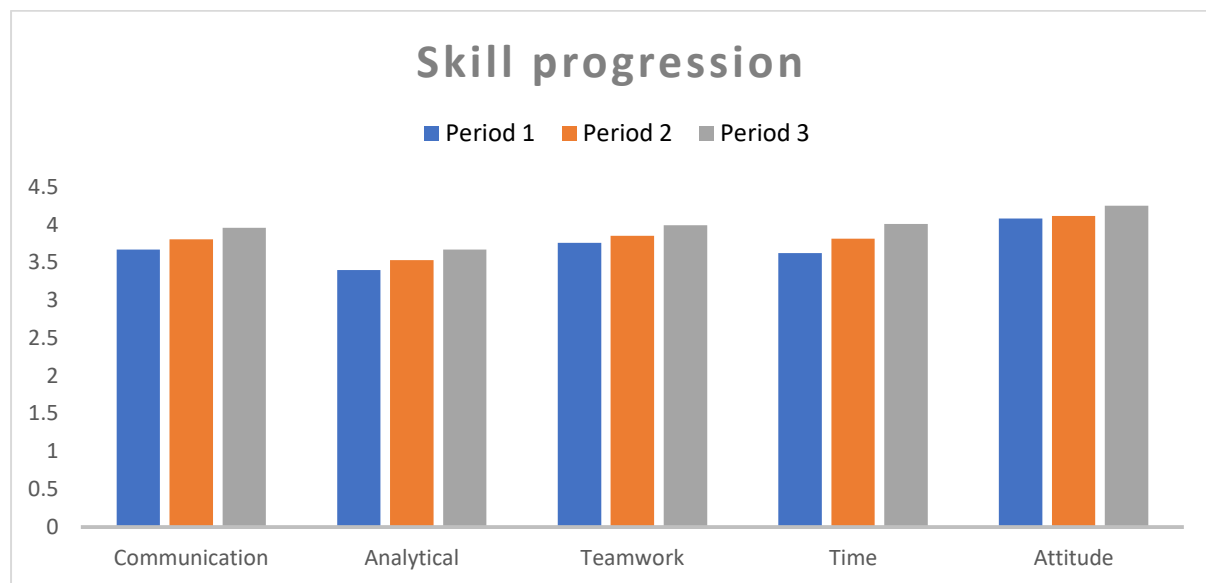
Having students reflect on the current level of their skills and identify potential areas of improvement initiates a process of learning. In between meetings with their mentor, students are expected to develop their skills. This can take the form of pro-actively applying for chairing roles within the tutorial, formulating a number of questions prior to the tutorial, or purposefully monitoring the means by which fellow students try to engage the rest of the group.

In a sense, the portfolio works much like a formative evaluation. It does not try to cast an objective measurement, but is rather used to create opportunities for critical self-reflection and reflection with the mentor, initiating a process of remediation and learning. As a result, we expect that students will ultimately improve their generic (PBL) skills throughout the mentoring programme.

SKILLS DEVELOPMENT IN EUROPEAN STUDIES

The surveys analysed in this paper were distributed at three intervals during the academic years 2015-2016 and 2017-2018. Due to unforeseen practical obstacles in terms of ICT support, the online portfolio could not be used in the academic year 2016-2017. Out of 627 students, 414 completed the first and second wave of the survey. For the third and final survey, no individual reminders were sent to the 2015-2016 cohort due to the aforementioned practical obstacles, resulting in a significant drop in the response rate, with only 126 students (out of 320) participating. The comparison between the second and third wave therefore relies on a reduced sample of 283 students.

We decided to pool the two cohorts for the ensuing analysis. At the level of the aggregated indicators depicted in Figure 1, pairwise t-tests indicate that the difference between the two cohorts was not significantly different from zero across 14 out 15 comparisons.[2] At the aggregate level, the measured skills evolved positively across the three waves. In the following sub-sections, we analyse each of the five identified skills in greater detail discussing its items, the evolution across the three measurements, and an assessment of their significance. These results are then contextualised in light of the BA ES curriculum and students' exposure to an active learning environment.

Fig 1. Skill progression in an active learning environment: first-year Bachelor students

Skill progression

Legend: ■ Period 1 ■ Period 2 ■ Period 3

Categories (x-axis): Communication, Analytical, Teamwork, Time, Attitude

Y-axis scale: 0 to 4.5

Communication skills

Student responses with respect to their communication skills are summarised in Table 2. Looking at the separate items, three observations can be made. First, the responses are invariably high, which suggests that students consider their communicative skills well developed. Second, while students believed they made progression on most items, their ability to 'listen to their fellow students' remained unchanged at a reasonably high level (highlighted in grey). A third and final observation can be made with regard to the timing of improvement across the different items: that is, improvements from the first to the second period mostly concerned students' propensity to ask questions, the chairing of meetings, their ability to summarise theories and concepts, and to wrap up a discussion.

This is not surprising as these questions refer to the basic PBL skills that students will be confronted with first.[3] Chairing and summarising concepts in a novel teaching environment are quite alien to a student just entering HE and may thus appear more difficult at first. From the second to the third period, we mostly noted improvements in students' self-assessed ability to raise questions and communicate their ideas. These are more advanced PBL skills and, in that sense, it is perhaps not surprising that an improvement only becomes visible later in the year. An alternative explanation could zoom in on the dynamics within the classes they attended. Courses organised in between the last two measurements deal with more contemporary issues, which – potentially – stimulates greater debate. Yet, at the same time students are also confronted with teaching that is less in line with basic PBL principles – varying by course and by tutor – which may actually go at the expense of proper training of generic skills. All differences were tested using a matched pairs t-test in STATA.

Table 2. Communication skills – item responses

Item	Avg	Sd	Δ1	Δ2
I dare to raise questions in case issues remain unclear	3.92	0.91	0.10**	0.17***
I am able to communicate my ideas in a clear and succinct way	3.65	0.78	0.09	0.19***
I listen carefully to my fellow students if needed I ask for clarification	4.17	0.75	0.00	0.10*
I am able to summarise theories and concepts	3.70	0.79	0.19***	0.12**
I am able to wrap up a discussion	3.60	0.83	0.11***	0.10**
I am able to chair a meeting, realising a productive, collaborative atmosphere	3.69	0.90	0.22***	0.14***
Aggregated Indicator	3.79	0.57	0.12***	0.14***

* Significant at the 0.9 confidence interval; ** significant at the 95% confidence interval; *** significant at the 99% confidence interval

Analytical skills

It was already apparent from Fig.1 that students had most difficulties with analytical skills. While progression has been quite significant, there is much variation across the different items.

Table 3. Analytical skills – item responses

Item	Avg	Sd	Δ1	Δ2
I am able to distil and communicate relevant topics from a text/assignment	3.72	0.73	0.13***	0.13***
I am able to phrase a clear, to the point and unequivocal problem statement	3.54	0.84	0.19***	0.16***
I am able to exemplify by highlighting relevant examples or counter examples	3.70	0.74	0.05	0.10*
I am able to reveal incorrect and unfounded arguments	3.44	0.84	0.10**	0.12**
I demonstrate reflective insight	3.56	0.73	0.13***	0.17***
I have the ability to give a discussion analytical depth	3.33	0.82	0.24***	0.15***
I am able to raise additional questions that highlight issues which are overlooked or taken for granted	3.43	0.90	0.05	0.18***
I am able to highlight the analytical/theoretical progress which has been made during a group session	3.40	0.79	0.05	0.28***
Aggregated Indicator	3.51	0.55	0.12***	0.16***

* Significant at the 0.9 confidence interval; ** significant at the 95% confidence interval; *** significant at the 99% confidence interval

As in the previous section, the items most strongly associated with PBL showcase large improvements in the short run. Phrasing problem statements and distilling the relevant topics from an assignment are two obvious examples. Giving a discussion analytical depth is a more unfamiliar skill for any new student. Through their experience in the first year, their sense of self-efficacy may have shifted, explaining the significant improvements. Alternatively, students may become more experienced with using theories and concepts during group discussions.

Yet, the responses also raise questions regarding the application of PBL and the role of the different tutors supervising the groups, as well as the extent to which dynamics within the tutorial create a constructive learning environment. Future research explaining skills acquisition in a PBL context should – ideally – enable differentiation across the tutor groups and courses that students attended.

Several items did not show a notable increase over a single period, predominantly in the earlier stages. Yet, the sizeable improvements over the two consecutive periods did culminate in a 'significant' improvement over the course of our measurement. In a sense, this is not so surprising as the acquisition of some skills may take more time than others. The analytical skills required are also often new to students, with some students taking more time to adjust than others.

Teamwork

We can deduce from Fig.1 that students' self-assessed skills in teamwork were already at quite a high level. The Matching procedure discussed above may be partly responsible as students that lack such skills are more likely to prefer a 'traditional' individualistic teaching philosophy (cf. Bijsmans and Harbers 2014). Indeed, the Matching procedure probes both at substantive interests and affinity with Maastricht University's PBL format. Looking at the specific items in Table 4, more variation is uncovered. The items for this generic skill showed more limited improvements across the different measurements. This can partly be explained by the relatively high averages on specific items, leaving limited room for improvement. Students' willingness to share knowledge or showing respect for different opinions or cultural sensitivities (average 4.35 and 4.25) are examples thereof.

Table 4: Teamwork – item responses

Item	Avg	Sd	Δ1	Δ2
I create room for all students	4.18	0.81	0.09**	0.11**
I am willing to share my knowledge	4.35	0.79	0.03	0.10**
I contribute to making a PBL session into a real group session, also giving room to 'silent' students	3.75	0.90	0.06	0.10*
(While brainstorming,) I am able to think 'creatively' to bring in new perspectives	3.49	0.86	0.07	0.16***
I encourage fellow students to come up with additional, complementary or opposing views	3.33	0.94	0.07	0.15***
I dare to discuss obstacles to a productive group setting	3.46	0.89	0.08*	0.27***
I am able to reflect upon the group dynamics and suggest interventions to improve its dynamics	3.52	0.91	0.15***	0.16***
I show sensitivity for cultural differences	4.25	0.82	0.07	0.12**
I am able to discuss diverging insights/perspectives, without jumping to conclusions	3.84	0.81	0.15***	0.08
I have the ability to discuss normative/ethical/political issues, showing respect for opposing views	4.30	0.76	0.09**	0.03
Aggregated Indicator	3.85	0.54	0.09***	0.12***

* Significant at the 0.9 confidence interval; ** significant at the 95% confidence interval; *** significant at the 99% confidence interval

The biggest improvements can be observed with regards to the groups' functioning. The willingness to discuss or reflect upon the group dynamics is something innate to PBL environments. It is therefore not surprising that students see this skill as having improved most strongly throughout the three waves.

Time management

A fourth generic skill deemed relevant in a PBL context is time management, which concerns both the pre and post-discussion phases during the group meetings and the self-study phase at home. Students collaboratively need to decide upon a strategy to tackle the problem at hand. During the self-study phase they gather and study the necessary material, alone or with fellow students. The seven steps offer a strategy to cope with the challenge of managing time. This may help explain the initial low score for students' abilities to develop strategies to tackle complex problems, but also their significant improvement over the year.

Table 5: Time Management – item responses

Item	Avg	Sd	Δ1	Δ2
I am on time	4.31	0.95	0.07	0.13**
I demonstrate to have done what is expected from me	3.89	0.87	0.06	0.10**
I possess time management skills, e.g. as chairman of a meeting	3.77	0.90	0.22***	0.08
I am time efficient	3.56	1.00	0.20***	0.23***
I am able to develop strategies to tackle complex problems	3.45	0.84	0.21***	0.23***
I am able, if needed, to divide tasks and responsibilities	3.83	0.85	0.16***	0.16***
Aggregated Indicator	3.79	0.65	0.15***	0.15***

* Significant at the 0.9 confidence interval; ** significant at the 95% confidence interval; *** significant at the 99% confidence interval

Professional attitude

Professional attitude was the fifth and final skill included in the questionnaire. Contrary to the skills discussed earlier, here we find several items in which no improvement could be observed (highlighted in grey). The set of questions formulated had a strong signalling function for the behaviour expected from students in the BA ES. As a result, several items had a high social desirability bias. With an average score of 4.69 and limited variation, it is not surprising barely any improvement can be observed in the first two items.

Table 6: Professional Attitude – item responses

Item	Avg	Sd	Δ1	Δ2
I communicate in a respectful way with fellow students and with staff members	4.69	0.57	-0.01	0.09
I show interest	4.44	0.70	-0.06	0.12
I recognise that there are no silly questions	4.02	1.01	0.08	0.12[?]
I am aware of my strengths and weaknesses	4.01	0.78	0.02	0.24**
I am able to create synergy between theories, practices, and personal experiences	3.58	0.82	0.11	0.30***
I inform my tutor in case of absence	4.41	0.93	0.11	0.07
I am able to recall relevant insights from previous sessions and courses	3.90	0.75	0.11	0.17*
Aggregated Indicator	4.15	0.52	0.02	0.14**

The difference between the third and first measurement was significant with a confidence interval above 95%; * significant at the 0.9 confidence interval; ** significant at the 95% confidence interval; *** significant at the 99% confidence interval

As highlighted earlier, the portfolio aims to advance students' skills by stimulating active reflection. In that sense, it is interesting that students' awareness of their strengths and weaknesses significantly increased over time. In future research, it may be interesting to consider a selection of items.

CRITICAL REFLECTION

The portfolio from which the data was derived was not primarily conceived as a formal measurement of skills acquisition. It had a signalling function to create awareness among students of the skills and attitudes deemed appropriate to create a stimulating PBL environment, but it also provided a means of – guided – reflection on students' behaviour within their tutorials. This results in two challenges highlighted in this section: on the one hand, there is the limited transferability of the questionnaire to other teaching environments (external validity); on the other hand, the selection and formulation of specific questions (internal validity) are sub-optimal for an objective academic assessment.

Transferability to other teaching programmes or institutions is important to create a test group to assess the impact of a teaching innovation. There are ethical objections to expose only a subset of the students to educational innovations that aim to improve student learning. Comparing across institutions or programmes thus presents an interesting alternative. To properly assess whether an active learning environment is better at stimulating certain skills, the derived measures need to be equally applicable in other contexts. The current formulation does not permit such immediate transfer. Several questions are highly context-specific and refer to concepts inherent to the PBL format, but are alien to more conventional teaching (such as chairing or formulating problem statements), or to the international teaching environment in Maastricht (such as sensitivity for different cultures).

Related to this observation, it is important to note that the skills we focused on above are not uniquely linked to the BA ES programme. These are generic skills that have also been addressed by other studies (Salomonson, Aberg and Allwood 2012; Jackson 2014). These studies have come up with different measuring instruments – all with slightly varying focus, but often with a stronger methodological basis. Drawing on such research can be useful as it may provide us with validated survey instruments, but it also enables proper benchmarking to compare our findings.

This also brings us to the second critical reflection regarding the challenge of internal validity. As explained above, the questionnaire was originally not conceived of as an instrument for research. Less attention had therefore been devoted to criteria of proper survey design. For example, the questions focused on students' *abilities* instead of their *inabilities* or challenges. The absence of 'negatively framed' items may bias responses and reduce variation in our measures. The portfolio was set up with the aim to help students identify their strengths and weaknesses and re-direct their learning activities within the tutorials to address individual challenges. Certain questions therefore had a largely pedagogical signalling function, creating awareness of cultural diversity, inclusion and collegiality. As a result, these questions suffered from a high social desirability bias and invariably high scores.

CONCLUSION

Generic skills have been attributed increased importance in recent debates about HE. It comes as no surprise then to find the mainstreaming of innovative teaching activities where students can practice generic skills, whether they concern simulations, internships or skills trajectories on research

methods. The issue of evaluation of such activities is not only a practical nuisance within a traditional curriculum (how many ECTS credits correspond with a simulation? How to put a grade on an internship?), but also warrants our attention as evaluation provides opportunities for feedback. A proper assessment is thus needed to help students direct their learning efforts and mitigate their weaknesses. It also enables an assessment of the effectiveness of the various methods devised to improve the development of students' skills.

In this paper, we propose the portfolio as a tool for reflection and self-guided learning. The questionnaire in the portfolio was particularly oriented towards a set of generic skills central to the PBL philosophy employed at Maastricht University. The questionnaire provided data for five such skills and our ensuing analyses showed improvement throughout the first year. It also laid bare several weaknesses and points for improvement.

Can we reconcile the educational objectives of the portfolio with our scholarly objectives? We believe it is definitely possible to achieve a better compromise and are currently considering four directions for improvement. First, and most obviously, we would like to revise the questionnaire to address the critiques formulated in the previous section. Second, we consider exploring the possibilities for explanatory analyses to better identify which factors stimulate the mastery of different skills. Such progression may be determined by sociological factors (gender, age, educational background), active participation in PBL tutorials (attendance, participation, taking up chairing roles), and contextual factors (consistent application of PBL characteristics, group dynamics in a tutorial, the role of the tutor or the quality of mentoring provided). A third direction of future research would take a holistic approach in studying the portfolio. In this study we have focused exclusively on the questionnaire, but did not delve deeper into the other components of the portfolio and how they relate to the quantitative self-assessment. The fourth direction is to proceed comparatively and incorporate similar questionnaires in other universities that apply different pedagogical principles.

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ENDNOTES

[1] Note that the European Commission also plays an important role in the Bologna process. See Dakowska and Serrano-Velarde 2018 on the relation between EU policies and inter-governmental frameworks.

[2] All items were averaged into a single scale using equal weights. For all skills, the set of items only contained one eigenvalue that scored above 1, so no additional factors were extracted. Consistency of the constructed indicator was medium to high with Crombach alphas between 0.73 (attitude) and 0.84 (analytical skills).

[3] Note that students are introduced to PBL during the aforementioned introduction days.

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