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TreKker Model® - CASE STUDY ON TreKker Model®'s IMPACT ON SELF-BELIEFS

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TreKker Model® - Case study on TreKker Model®'s impact on self-beliefs

TreKker Model® - Estudo de caso do impacto do Model TrekKer nas crenças pessoais

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Resumo

Trekker é um modelo de intervenção concebido para estudantes que visa desenvolver o indivíduo como um todo integrado. Este modelo foi criado para ser usado como referencial para o desenvolvimento de habilidades individuais em ambiente acadêmico. Como resultado da implementação do Processo de Bolonha, Instituições de Ensino Superior na Europa são obrigadas a focarem-se em habilidades e competências em vez das tradicionais palestras centradas nas habilidades técnicas (Comissão Europeia, 2009a). Este artigo apresenta um estudo exploratório com estudantes da Universidade Católica de Portugal, Faculdade de Biotecnologia. Em 2009/ 2010, fizemos uma experiência com a combinação de cursos de graduação. Neste contexto, o modelo de Trekker foi usado para apoiar o desenvolvimento da aprendizagem ao longo da vida, inteligência emocional e habilidades transferíveis. Os primeiros resultados após a intervenção parecem promissores em termos de aumento da auto-estima dos estudantes, auto-eficácia e auto-confiança. O estudo apresenta algumas limitações relacionadas ao número de participantes e tempo de execução e deve ser repetido para ter resultados mais consistentes.

Palavras-chave: Habilidades; Inteligência Emocional; Educação permanente; Auto-eficácia

Abstract

TreKker is an intervention model designed for students which aims to develop the individual as an integrated whole. This model was created to be used as a framework for individual skills development in an academic environment. As a result of the implementation of the Bologna Process, Higher Education Institutions in Europe are required to be more focused on skills and competences than on traditional lectures centered on technical skills (European Commission, 2009a). This article presents an exploratory study with students from the Catholic University of Portugal, Biotechnology College. In 2009/ 2010 we experimented with combining degree courses. These courses would then both focus on the same skills development and share assessment techniques. In this framework, the TreKker model was used to support the development of lifelong learning, emotional intelligence and transferable skills. Early results following the intervention appear promising in terms of increases in students' self-esteem, self-efficacy and self-confidence. The study had some limitations related to number of subjects and execution time and must be repeated in order to have more consistent results.

Key-words: Skills; Emotional intelligence; Continuing Education; Self Efficacy

Resumen

Trekker es un modelo de intervención diseñado para estudiantes que pretende desarrollar al individuo como un todo integrado. Este modelo fue creado para ser utilizado como un marco para el desarrollo de las habilidades individuales en un ambiente académico. Como resultado de la aplicación del Proceso de Bolonia, Instituciones de educación superior en Europa están obligados a estar más centrado en las habilidades y competencias que en las clases magistrales, centrado en las competencias técnicas (Comisión Europea, 2009a). En este artículo se presenta un estudio exploratorio con estudiantes de la Universidad Católica de Portugal, Biotecnología Colegio. En 2009 / 2010 se experimentó con la combinación de cursos de grado. Estos cursos de entonces ambos se centran en el desarrollo de las mismas habilidades y compartir técnicas de evaluación. En este marco, el modelo Trekker se utilizó para apoyar el desarrollo del aprendizaje permanente, la inteligencia emocional y habilidades transferibles. Los primeros resultados tras la intervención parecen prometedores en términos de aumentos en los estudiantes la autoestima, la autoeficacia y la confianza en sí mismo. El estudio tuvo algunas limitaciones relacionadas con diversos temas y el tiempo de ejecución y debe repetirse a fin de tener resultados más consistentes.

Palabras-clave: Habilidades; Inteligencia emocional; Educación continua; Autoeficacia

Theoretical framework

Lifelong learning is defined by all of the learning activities performed throughout one's life in formal, non-formal or informal contexts, with the goal of promoting the development of knowledge, abilities or skills in a personal, civic or social perspective (Commission of the European Communities, 2001). It is suggested that Higher Education Institutions (HEI) encourage students to adopt lifelong learning perspectives, thus contributing to building a solid bridge between academia and the workplace (Boud, 2004; Edwards & Usher, 2001; Yorke, 2003). According to Candy (1995; 2000), in order to deal with the current learning challenges and contexts, one needs to develop certain attributes as a lifelong learner. Lifelong learning is also related to "learning to learn" as an endless process that includes actions such as: raising individual personal awareness and the capacity of self-monitoring and reflection about one's learning and experiences (Bilimória & Almeida, 2008; Chan, 2001; Freire, 2009; Printrich & De Groot, 1990; Vorhaus, 2002; Young, 2005). Lifelong learners will be equipped with a range of resources that allow them to invest in their own development in a consistent and continuous way, adapting their actions to meet their needs, interests and stages of life, and to assess their outcomes and process (Boud, 2004; Edwards, Ranson & Strain, 2002). The students' ability to make a commitment to their own learning and invest in it is also important for continuous learning (Adams, 2007). Confidence is an important element in the learning process (Norman & Hyland, 2003).

In the literature, *transferable skills* are designated in several different ways (Cabral-Cardoso, Estêvão & Silva, 2006; Washer, 2007). The term used in this study is *transferable skills* because it illustrates that once developed they can be transferred from one area of life to another (Bennet, Dunne & Carré, 1999, Evers, Rush & Berdrow, 1998). Unlike technical skills that could become outdated as a result of new innovations, transferable skills tend to continuously increase. The European Commission (2009b; 2010) and The Conference Board (1999) stress the importance of transferable skills, emphasising the importance of skills for productivity, competitiveness and innovation and identify the following key skills: communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, and cultural awareness and expression.

The broad importance of establishing close cooperative links between employers and HEI has been highlighted (Arnold & Davey, 1994; European Commission, 2009a, 2009b, 2010,

Conference Board, 1999) and consequently, fundamental contribution from employers is important when defining and assessing the importance of transferable skills in the business world and in a successful lifelong worker. This information is important to HEIs, in order to prepare students for future personal, academic and professional flexibility, challenges and demands (B-HERT Position Paper, 2002; Biotechnology Skills Profile Report, 2010; Koeppen, Hartig, Klime & Leutner, 2008). These interventions which aim to enhance transferable skills should take place whilst the student undertakes their degree programme and equip them for their future employment and subsequent lifelong learning. (Evers *et al.*, 1998; B-HERT Position Paper, 2002). The growing interest in transferable skills and their inclusion in academic curricula in Higher Education is justified by a number of economic, technological and educational reasons (Hager, Holland & Beckett, 2002; Robley, Whittle & Murdoch-Eaton, 2005). In the academic context, transferable skills can be developed primarily by being incorporated into curricula or worked on in parallel (Washer, 2007). The first option implies that skills would be embedded in the curricula, associating technical skills development with transferable skills development (Brown *et al.*, 2006; Hager *et al.*, 2002; Yorke & Knight, 2006). The second option can be implemented through modules dedicated to the development of skills, and also by creating a program that results in a certification in transferable skills, in addition to the degree (Washer, 2007). This is often referred to as a 'bolt-on' approach (Cranmer, 2006).

Developing *emotional intelligence* (EI) can result in graduates having positive levels of self-motivation, lifelong learning, dealing with their own and others' emotions, as well as managing instability and change (Hromek & Roffey, 2009; Jaeger, 2003). It is important to develop methodologies that incorporate emotional intelligence in HEI because students demonstrate a better performance when their Emotional Quotient (EQ) is well developed (Qualter *et al.*, 2007), implying that it is as important as technical skills development (Clark, Callister & Wallace, 2003). Nevertheless, high general intelligence quotient contributes substantially to intellectual and emotional well-being (Ciarrochi, Chan & Caputi, 2000; Salovey, Bedell, Detweiler & Mayer, 2000). With higher levels of emotions management, people tend to better manage instability and stressful situations, in special by reflecting upon and communicating their problems (Ventura, 2005). People with high level of EI also have better resistance levels to tension and act more proactively, and in addition, they also have the tendency to be better leaders (George, 2000; Jaeger, 2003; Jordan, Ashkanasy & Härtel, 2000). It is important to highlight that the optimal decision making process, to choose what and how one learns, depends both on cognitive skills, as well as on emotional skills (Damásio,

1994; Jaeger, 2003; Qualter, Gardner & Whiteley, 2007). Consequently, it has become important to embed aspects of emotional intelligence into teaching and learning strategies. It is possible to develop emotional intelligence in students in two ways: i) using evaluation measures to identify areas in which a given person is less competent and, therefore, define ways of developing those areas through an intervention based on praxis and reflection of experiences; ii) incorporating socio-emotional learning into curricula by training the teachers who would be facilitators in the emotional integration of experiences and in the transfer of these to real life (Clark *et al.*, 2003; Hromek & Roffey, 2009; Qualter *et al.*, 2007; Schutte, Malouff, Hall, Haggerty, Cooper, Golden & Dornheim, 1998; Sherlock, 2002). The Salovey, Mayer and Caruso (2002) model of Emotional intelligence was our framework and it is divided into quadrants: (insert Table 1)

Technical skills can be described as those skills that differentiate a certain specialized area of knowledge (Evers *et al.*, 1998; Alic, 2008) which is specific to different study areas. Warn and Tranter (2001) define skill as the capacity to use attributes and knowledge in an effective way, aiming to attain a certain goal in a given area and is a fundamental part of academic development (Lima, Carvalho, Flores & van Hattum-Janssen, 2007; Powell, 2004). Through these skills, students have access to a recognized body of knowledge which may be essential to the entry into a particular profession (Alic, 2008; Biotechnology Skills Profile Report, 2010; Evans, 2001). Proposals on the adoption of new methodologies where teaching-learning systems become more centred on the students, as opposed to the traditional methodologies centred on the teacher where a student had a passive role to play (Powell, 2004; Van Hattun-Janssen & Vasconcelos, 2007), could help to combine a range of skills with the teaching of technical aspects. Students acquire technical skills from their own experience and reflection: it is as important to develop student's critical thinking and communication skills, as these can be applied to their subject areas (Huba & Freed, 2000; Savery & Duffy, 1996). In conclusion, the Bologna Process is integrated in the Framework of the European Union's Lisbon Summit where the objective to make Europe "the most competitive and dynamic economy of knowledge in the world by 2010", (European Council, 2000). In a broad sense when curricula innovation is referred to, it translates as new ways of teaching and learning. For teachers to be able to incorporate these skills into their curricula, they will also need to develop them and develop new pedagogical ways to teach it (Gould, 2002) and have to decide the best pedagogical methodologies (Orsmond, 2004; Brown *et al.*, 2006; Tanner & Tanner, 2007). Companies are increasingly willing to recruit graduates from any course of studies, provided that they present a high level of transferable skills (Brown *et al.*, 2006, Yorke & Knight,

2006). Therefore, curricula should be broader in order to meet the market needs, i.e. need to incorporate transferable skills in addition to subject specific technical skills (Hager *et al.*, 2002). Goodnough (2006) argues that a more constructivist approach adopted by teachers will promote a greater use of self regulated skills by students and result in greater understanding. When teaching methods are meant to be "student-centered", they are intended to promote pro-activity and construction of meanings which implies respect for the student's time, ensures they understand what is expected of them, and encourages autonomy and self-regulation (Alarcão, 1996; López, 2006; Marques, 1997; Purdie & Hattie, 1996, Tynjälä, 1999; Vrasidas, 2000). To sum up, the self-regulated student is able to identify objectives, identify and develop strategies to achieve goals, develop plans of study, reflect on their learning, identify and select information sources and evaluates their own progress in learning (Chan, 2001; Cowan, 2004) in terms of technical and other soft skills.

Watts (2006) emphasises sustainable *Employability* which focuses on aspects such as skills development and lifelong learning. Knight and York (2002, 2006; Yorke, 2006; Yorke & Knight, 2006) emphasizes HEI's role in the development of these dimensions. The *TreKker Model* is a proposed model for developing skills. The aim is for students to develop individual mechanisms that contribute to their wellbeing, success and integration in a variety of contexts throughout their lives. TreKker is used as a metaphor to illustrate that in life people have the control to choose their own path and the ability to define their journey or 'trek'. Making the journey is a personal adventure, unique as each individual. Students establish their own employability parameters in the sense that they have the necessary tools to enter the professional world and to maintain their employability. Knight and Yorke (2006) point out that people can increase their likelihood of securing graduate jobs if they are able to demonstrate their level of skilful practice development to potential employers. Individuals are responsible for their professional path development as well as their autonomy and personal management capacities. Hillage and Pollard (1998) and Kuijpers and Scheerens (2006) suggest that the actual labour market changing context is something upon which the individual has no control over, so their choices are regulated by what the market offers.

Results suggest that employers from five countries view transferable skills as of greater importance than subject specific technical skills when recruiting graduates (Biotechnology Skills Profile Report, 2010). It is proposed as a model to support curricula innovation by developing transferable, lifelong learning, and emotional intelligence skills, that in turn have a positive impact on technical skills. It will become more effective if it is truly integrated across the institution and accepted as part of academic culture (Atlay & Harris, 2000, Tanner

& Tanner, 2007). Therefore, being integrated into the whole academic experience, supported by teachers and staff, it will become more effective for the student. Students are more likely to engage in this type of personal development when they can provide meaning to their daily life experiences and consequently, may be more prepared to engage in proposed academic activities (Guidano, 1991; Mahoney, 1991; Purdie & Hattie, 1996; Tynjälä, 1999; Vrasidas, 2000). Subject tutors have an important role to play in the process by explaining it to students and by establishing partnerships with employability staff (Baker, Kame'enui, Simmons & Simonsen, 2007; Bloxham, 2004; Gould, 2002; Tanner & Tanner, 2007).

University learning is dependent on the following factors: i) access to the support theory of that domain of knowledge; ii) heuristic strategies for analyzing and solving problems; iii) skills for self regulated learning; iv) self beliefs; v) emotions and positive attitudes related to their academic performance (De Corte, 2000, cited in Yorke & Knight, 2004). Thus, self beliefs are a fundamental factor of students' academic performance (Pintrich, 1999; Purdie & Hattie, 1996; Yorke & Knight, 2004; Young, 2005; Zimmerman, Bandura & Martinez-Pons, 1992). Self beliefs are the beliefs that people have about their ability to reach certain levels of performance. In other words, they are the beliefs that each one has about his/her own ability to deal with a situation that influences the way the self feels, thinks, is motivated and behaves. (Coelho, Vasconcelos-Raposo & Fernandes (2007); Cruz, Viveiros, Alves, Gomes, Matos, Ferreira & Dias, 2006; Pajares, 2002; Rocha, 2008).

In general, people with positive self beliefs are confident in their abilities and tackle difficult tasks as challenges to overcome. On the other hand, those with negative self theories doubt their abilities and tend to perceive difficult tasks as personal threats, thus avoiding these situations (Coelho *et al.*, 2007; Coimbra & Fontaine, 1999). According to some literature (Humphrey, 2004; Knight & Yorke, 2002, 2006; Robins & Pals, 2002; Yorke and Knight, 2004; Zimmerman *et al.*, 1992), self theories are elements which positively influence the process of developing skills. It is important to reflect on Robins and Pals' (2002) view which stresses that self theories become relatively stable over time. In this model it is believed that people can change over time, and even if it is a small change, it represents a positive result. Reflecting on experiences and assessing progress are decisive for self-efficacy, self-confidence and self-esteem development (Monks, Conway & Dhuigneain, 2006). These three elements are the crucial connection between the development of knowledge; understanding; skills; experience; personal attributes; and employability. The importance of Emotional intelligence in the model is related to its moderating qualities in the association between self efficacy and academic performance (Adeyemo, 2007). Self-efficacy is positively correlated

with academic performance because it influences the way students accept challenges and see opportunities in obstacles, making them more persistent and resilient, presenting lower anxiety levels when facing evaluation, and demonstrating flexibility in the methods of study they used, thus being capable of more self-regulated learning. Self efficacy is implicit when students are encouraged to be autonomous, to outline objectives and to plan their own development (Boekaerts, 1997; Pintrich, 1999; Zusho & Pintrich, 2002).

The Trekker Model features an *Ecological - Developmental - Constructivist* approach. The ecological perspective is related to a holistic view that is intended in the process. Constructivism sustains that a person creates or constructs their own understanding or knowledge through the interaction between what they already know and believe, and the ideas, events, and activities with which they comes into contact (Cannella & Reiff, 1994; Richardson, 2003). In this sense, career is a developmental concept and should be promoted from childhood onwards (Super, 1990). The constructivist model proposes the non-existence of objective reality, but as a reflection of the perception built in the context of personal history, life experiences and the structures of meaning that have been developed throughout the life cycle, through the individual's relationship with others and the world (Guidano, 1991; Mahoney, 1991;). At each life stage it is possible for the person to rebuild their reality and to change the way they embody concepts of the past (Kegan, 1982).

Objectives

The main goal of this study is to assess whether an intervention with university students based on the TreKker's model has had a positive impact on self-esteem, self-confidence and self-efficacy. Through the extensive literature review presented, it is expected that an intervention at the transferable skills level, developing strategies to cope with emotional stress and de-motivation, and also, the development of lifelong learning skills, will have a positive impact on self-efficacy beliefs.

Methodology

Participants

Initially there were 51 respondents in the study, but only 40 (N=40) participated in the complete study. Participants were students from the Catholic University of Portugal, Biotechnology College, with an age range between 20 and 36 years old. The age average was 22 years (SD=2,69) which is expected since they were all finalists in their third year of studies (N=42). Eleven respondents are males and twenty nine are females. The inferior number of

males in the sample is justified by the large effective number of females in the Biotechnology College.

Instruments

The following instruments were used at the study's two stages (pre intervention and post intervention): Competitive State Anxiety Inventory-2, by Martens, Vealey and Burton (1990) - Scale of Self-Confidence. This scale is constituted by 10 in a four likert scale response, from "Nothing" to "Much" [Adapted to Portuguese by Cruz *et al.* (2006)].

General Perceived Self-Efficacy Scale, by Schwarzer and Jerusalem (1993). The instrument also has ten items and is presented as a four points likert scale, from "Strongly Disagree" to "Strongly Agree" [Adapted by Coimbra and Fontaine (1999)].

The Rosenberg Self-Esteem Scale, by Rosenberg (1965), is a ten items self-report measure of global self-esteem, again in a likert scale format, with six points, from "Totally Disagree" to "Totally Agree" [Adapted by Rocha and Matos (see Rocha, 2008)].

Design and Statistical Analysis

This is a pre-test/post-test design using time (the two administrations levels for self-confidence, self-efficacy and self-esteem) as factors. This method is fairly suitable for situations where we want to assess changes in behaviour or perception, or to facilitate change and learning (Almeida & Freire, 2003). The first evaluation was performed on February 22nd., 2010 and the second one occurred on July 29th of the same year. Thus about a semester mediates both administrations.

The first order Confirmatory Factor Analysis (CFA) was performed with an effective of 51 respondents. These procedures were performed using EQS statistical program, version 6.1, and internal consistency studies were conducted using PAWS statistical package (version 18). Mean differences between pre-test and post-test scores were performed appealing to paired samples t-test for a significance level of $p<0,05$; multivariate tests were conducted having Pillai's trace as criterion, again at a significant level of $p<0,05$. Both former procedures were carried out with PAWS statistical package, version 18.

Procedures

The model was integrated in two subjects, namely "Development of personal skills" and "Project". These subjects are both part of the curricula of the 3rd year of Bio-Engineering and Bio-Sciences, from the 1st cycle of university studies. The teachers of these subjects worked together in order to respond positively to the challenges of implementing Bologna guidelines and to provide a teaching-learning environment appropriate for self-regulated learning.

The Project's subject was developed in a project-based learning strategy and aimed to develop technical skills in a specific scientific area while simultaneously developing transferable skills. In order to accomplish these objectives, we integrated the skills needed into the "Development of personal skills" (DCP), another 3rd year subject.

The discipline of Project will be developed in interaction with the discipline of DCP and is based on Problem Based Learning, which is a practical and active teaching technique, focused on researching and solving real problems. It fits within the constructivist theories of learning, which envisage learning as an active process, by which students build new ideas and concepts based on their own knowledge. Students select and transform information, define hypotheses and make decisions, organizing their knowledge in individual cognitive structures. In educational terms, this theory implies that learning and developing skills is an autonomous task carried out by the students, where they are encouraged to discover basic principles for themselves. This type of learning leads not only to the acquisition of technical skills specific to the discipline or area involved, but it also allows, due to its nature, the development of skills that are transferable to other contexts, such as: analysis and problem solving, critical thinking, cooperation and teamwork, decision making and self-regulation. In practical terms this approach has several phases, in which students take responsibility for the learning pathway they chose, while teachers appear as facilitators and enablers of that journey, having a role that is active:

- Presentation of the problem – in which a problem that is authentic, real and relevant to the discipline, is presented to students without all information being present (incompletely defined problem) – Project. Forming groups to discuss the problem. At this stage, the group defines key points of the problem being discussed, as well as knowledge each one already possesses and what they need to acquire (learning needs), to reach a solution.
- After a self-study phase, group meets again to share results achieved, and previous phase is recycled, with a better definition of problem, presenting and discussing hypotheses or pointing out gaps to be filled - Project: Scientific Tutor.
- During the process, teacher can act as a facilitator, providing students with useful strategies for the problem solving process - Tutorials / DCP.
- Preparation and presentation of answer - after the process of defining problem and search for information is complete, students prepare answer or solution to the problem, which must be presented and defended, taking into account the reasoning process used

in its preparation and its theoretical foundation – Public presentation with companies invited - DCP + Project

The link between Project and DCP will be as follows:

1. Both disciplines should share scheduling, so that activities are consistent and interconnected. For example, if in Project groups are working on planning, they will receive "training" in this area in DCP classes

2. Throughout the process, students will receive tools in order to develop skills to be evaluated in the Project, particularly in terms of communication, organization, critical thinking and teamwork, whether in the classroom or through team coaching.

3. The final presentation will serve three key objectives:

a) Provide assessment of personal skills - DCP; b) Provide assessment of the ability to solve a scientific problem and its associated skills – Project; c) Allow for creation of link between companies and universities, building bridges for better employability.

DCP's course contents (All topics involve 4 hours of work between workshops and tutorials): "Oral Communication" and "Teamwork"; "Planning and Organization"; "Critical thinking" and "Creativity, Innovation and Change"

Project course content - Biosciences

-When submitting a proposal for a work topic, supervisor should take responsibility for their costs and ensure that all conditions necessary for its completion occur.

Responsible for discipline assesses proposals presented according to their educational component, choosing the most appropriate to the characteristics of the discipline in question.

-Any problem arising that could significantly undermine project's implementation, should be communicated in due course by students or supervisors, to those responsible for the discipline.

-A progress report (sent by e-mail) should be submitted. This report should briefly include objectives, results and main conclusions of work (maximum 2 pages).

In this process, the following will be considered: Work developed; Final written work: scientific paper format (according to Biotechnology Letters: http://www.springer.com/west/home/biomed?SGWID=4-124-70-35665545-0); Oral presentation of work developed.

Project course content – Bioengineering

-The discipline will include preparation of a work-project on a topic from the field of specialization selected by students (food, environment or biomedical).

-The topic may be proposed by students or teacher.

-This work's main goals are to stimulate synthesis and teamwork skills, as well as to foster mastery of the various fields necessary to an Engineering professional.

-Work will be performed in small groups, meeting weekly with teacher; students present work done in previous week and present plan for following week.

-Work will be performed in real environment, whenever possible including a brief analysis of organizational, economic, financial and social implications of project developed.

-Topics will relate to Technologies used in the selected areas, and students will be supported by companies in those industries.

-Where appropriate, there will be trips to manufacturing facilities of companies involved.

-Evaluation process will involve those responsible for discipline

-In this process following will be considered: Work developed; Final written work; Oral presentation of work developed.

Results

Results of this exploratory study will be presented at three analysis levels: first, psychometric properties of the instruments used to measure Self-esteem, Self-Confidence and Self-efficacy, secondly, presenting the Paired samples t-test results,and third the participants evaluation of the intervention. Although the study has an exploratory quality (N=52 in the first evaluation), all instruments were submitted to confirmatory factor analysis and internal consistency analysis (Cronbach's alpha) to study the psychometric qualities of the three instruments, presenting good results. Results are presented in the Results section.

Psychometric instrument's properties: Confirmatory Factor Analysis and Internal consistency studies

Through first order Confirmatory Factor Analysis on the three scales in the study, one can conclude that the three scales used are appropriate to evaluate the intervention of the target population. This CFA was based on the results of the scales completed at the intervention prior stage (pre-test). First order CFA's on all instruments showed adequate fit indexes, suggesting that the Trekker model developed under both subjects, "Development of personal

skills" and "Project" fits this sample data. Also one can observe that all three scales present high Cronbach's values. Table 2 shows the results (Insert Table 2).

Paired samples t-test

The impact of the intervention in self Beliefs theories was evaluated among the 40 students enrolled in the subject "Personal Skills Development", as previously described in "Procedures". A paired-samples t-test was conducted to test the hypothesis of the intervention have positive effects on self-esteem, self-confidence and self-efficacy.

The test for self-esteem, revealed that though there was not a significant statistical result [t(39)=-0,60, p=0,552] the scores attained delineate an increasing trend from pre-test to post-test with an eta squared statistic indicating a small effect. (η^2=-0,01). See Table 3 for mean and standard deviation results. (Insert Table 3).

For self-confidence the paired sample t-test also exposed a non-significant result [t(39)=-0,77], but again scores show a positive inclination from the pre to the post-test intervention; eta-square value specify a small effect (η^2=-0,02). Table 4 show the means and standard deviation for the pre and post-test occasions. (Insert Table 4).

Self-efficacy t-test for paired samples had a non-significant result [t(39)=-1,668, p=0,103]; once again it seems to be a growing tendency in the scores of self-efficacy, as can be observed in Table 5. The size effect was yet again small (η^2=-0,04), though it was the largest of the three paired variables in test. (Insert Table 5).

Results were acceptable, e.g. in general, after the application of Trekker's model there was an increase in student's measure of self-esteem, self confidence and self-efficacy, although in propensity manner. Note that none of these figures were statistically significant.

Students Evaluation

From the 49 students in this subject, 22 answered this evaluation questionnaire. Students' agree with the importance of transferable skills' development for academic performance, professional future and other areas. However, some seem to be uncertain with its integration into academic curriculum.

From these students, 95, 5% consider to have developed transferable skills in the academic context. In terms of impact of transferable skills development, some students are uncertain or disagree with the ones selected to be developed in this specific subject, although the majority consider them adequate. All consider that this development has contributed to their general performance.

Concerning the process of transferable skills development in the scope of this subject and its quality, some students seem to have not understood the motives, objectives for the

development of these specific skills, and skills' definition and performance criteria to be effective. They seem uncertain in what concerns materials' utility and the teacher's ability to relate skills with the subject. However, most consider that the teachers' proved to be able to motivate students and provide feedback in this matter. Nonetheless, these results show that teachers might benefit from more training and preparation for this kind of activities.

From these students, 4, 5% participated in coaching activities and the ones that did not participate mainly state that they lacked the time to participate and information on the activity.

Teachers Evaluation

Teachers' assessment of the quality of the process of integration of transferable skills into curriculum and the activities performed by the Fs-Biotech team demonstrates their satisfaction and agreement.

In terms of suggestions regarding the intervention teams - participation in the subjects and how it could be improved in order to guarantee the impact in terms of transferable skills' development, it was mentioned: "Intervention would have to be more active and consistent along time. Students do not seek support in the development of these skills by their own initiative."; "It is very hard to identify a relation of cause and effect. Anyway, there is a clear improvement along the semester, especially in terms of oral communication."; "In my case it's complicated because I was already identifying skills and the collaboration in the Project becomes a burden and with few classes, a program to complete and so much work, it becomes complicated to maintain the desired quality.".

Teachers do not seem to consider that this experienced promoted the development of their pedagogical practice. The one that agrees to some extent that his/her pedagogical practice developed with this initiative, states that he/she became more aware of the transferable skills included in classes' activities and that that could be even more improved. Another stated that the nature of the subject already implied the development of transferable skills.

On the other hand, these answers seem to demonstrate that teachers feel that they have already too much work and seem to be not available enough for the kind of work a project like this one involves.

Discussion

This was an exploratory study and should be replicated using a larger sample in order to obtain more consistent results. It was previously understood that the sample was small and the time of intervention would not be sufficient to make accurate assumptions about the

implementation of the model. Regarding the statistics, every care was taken in order to present results as close as possible to reality although the size of the sample and the time of the intervention were not being ideal. Participation was mandatory for third year students and so 40 participants were submitted to the program and therefore assessed on both scheduled occasions. Nevertheless, there were a sufficient number of participants to perform the first order confirmatory factor analysis to the scales used in the study taking into account the parameters to estimate (note that each scale had only 10 items). This result is important for future research. The scales can be used in other studies since they seem to present good psychometric properties (both in terms of indices of adjustment, and of internal consistency).

At the first level of analysis, results are indicative of a positive trend between the first and the second evaluation, showing that the intervention performed could have had an impact on the student's who participated. Between the pre-test and the post test, although t-tests results were not statistically significant, self-esteem, self-confidence and self-efficacy scores increased, 0,05, 0,06 and 0,14, respectively. This absence of significance could represent two different factors: the low numbers in the sample, but more importantly, the intervention length, with fourteen hours total for the three practical workshops, and three hours total for coaching sessions. These psychological interventions need, as literature points out, continuity in execution time, and more integration moments at the end of the experience. It cannot be said that the hypothesis was confirmed, but only that maybe the trend found is consistent with what was expected.

Conclusions, Limitations and Recommendations for future research

In the current context, students have to develop their skills, both to be able to deal with the academic context as well as with future professional contexts (European Commission, 2009a, 2009b, 2010; Gow & McDonald, 2000). Global market demands, as well as speedy technological development, generate a constant need for new tools, products and services that vary according to different cultural patterns (Cunha, Cunha & Kamoche, 2001; Koul, Clariana, Kongsuwan & Suji-Vorakul, 2009; Nadler & Tushman, 1989; Stasz, 1997; Wooldridge & Floyd, 1990). These circumstances, in turn, create the need for HEI to strengthen the development of technical and transferable skills, compatible with contemporary reality and needs, in a changing continuum. In addition, the labour market searches for employees that integrate in their organizations in terms of emotional labour (Morris & Feldman, 1996; Rafaeli & Sutton, 1987) and HEI's may contribute to the development of this skill that enhances one's ability to adapt to different work contexts. In this study, results are satisfactory. However, it is important to deepen this study in the future,

involving a larger number of students because of the significance of statistical inferences (Almeida & Freire, 2003) that could result from it. With this approach, it was intended to contribute to students increasing employability, as well as to perpetuate positive self beliefs and self regulated learning skills. We hadn´t evaluated the students employability and the self regulated learning skills. Although we had data in the literature that say that the self beliefs have a positive impact in the employability (Knight & York, 2002) and self regulated learning skills (Zimmerman, 2000). A curriculum in which contents, assessments and learning outcomes of the different subjects or curricular areas was created. This experience of linking Development of Personal Skills and Project was informally assessed as being positive, by both teachers and students. In general, students seem to consider that they have developed different skills according to the subject in question, which might be related to the subjects' program and curriculum. On the other hand, in all of these subjects, results show that teachers might benefit from more training and preparation for this kind of activities, which may be necessary to make them more aware of the importance of their active participation in intervention task forces, sharing practices and strategies that might transferable skills' integration into academic curriculum and its actual development. At the same time, with the regular meetings that were held, teachers from science and engineering areas have also developed their own skills. However, we still cannot draw more definitive conclusions from this experience, not only because of the small number of students who participated in the study, but also because of the reduced number of months, and length of the intervention sessions. As for the hypothesis in which it was hoped that the intervention would have a positive impact on self-beliefs, we can conclude that, although there were some positive changes, these were not statistically significant.

Furthermore, it is intended to monitor future interventions for a longer period of at least one full academic year. One semester is a relatively short period to be able to verify changes at the level of the theories of self, since changes at this level are processed slowly (Robin & Pals, 2002). Literature argues that self-efficacy beliefs are fundamental to good academic performance and thus, it is expected that subject´s submitted to this intervention in the future will achieve better learning outcomes and will be integrated more easily into the labor market (Printrich,1999; Purdie & Hattie, 1996;Yorke & Knight, 2004; Young, 2005; Zimmerman *et al.* 1992). Results lead us to the hypothesis that an intervention for a greater length of time could have a bigger impact. In this case, the evaluation could support another assessment stage, thereby enriching the findings of the psychological processes involved in these acquisitions. The other limitation in this study was there was no control group to understand how deep the model influenced the students.

In conclusion, we assume that this model is still a work in progress, and as we already said throughout the article, execution time should be lengthened, more students should be included and a control group should also exist. Without this assumption we recognize that despite the model indicated a positive effect on the self-beliefs of the students we can't assume that the results of the model are concrete. We are confident that this model will be very useful for Bologna Process as to Lisbon strategy implementation, in terms of promoting employability and making students' adaptation in the global changes easier.

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Tables

Table 1

Salovey, Mayer and Caruso's model: the quadrants

Perceiving Emotions The ability to accurately perceive one's own, as well as other's emotional state.	**Using Emotions** The ability to use emotions to enhance an activity or relationship.
Understanding Emotions The ability to understand, what makes a person feel a certain way, and to predict the way in which feelings will evolve and change.	**Managing Emotions** The ability to be open to our own feelings and to those of others.

Note: Based upon Salovey, Mayer and Caruso (2002)

Table 2

Scales first order confirmatory factor analysis fit indexes and Cronbach alpha values

	Scales		
Fit Indexes/Cronbach's α	***Self-Esteem scale***	***Self-Confidence scale***	***Self-Efficacy scale***
Chi square $_{(df)}$	$41{,}15_{(33)}$	$38{,}88_{(31)}$	$41{,}01_{(32)}$
p	0,16	0,13	0,13
SRMR	0,70	0,06	0,073
RMSEA	0,07	0,08	0,08
CFI	0,97	0,96	0,95
Cronbach's α	88,9	89,1	87,9

Note. Chi-squared value significant at p.<0,05

Table 3

T-test results for paired samples: Self-Esteem Scale (pre-test and post-test). N=40

Self-esteem	**Mean**	**Standard Deviation**
Pre-test	5,07	0,77
Post-test	5,12	0,73

Note. Significance was tested for a p≤0,05. None of the results were significant.

Table 4

T-test results for paired samples: Self-Confidence Scale (pre-test and post-test). N=40

Self-confidence	**Mean**	**Standard Deviation**
Pre-test	3,24	0,47
Post-test	3,30	0,44

Note. Significance was tested for a p≤0,05. None of the results were significant.

Table 5

T-test results for paired samples: Self-Efficacy Scale (pre-test and post-test). N=40

Self-efficacy	**Mean**	**Standard Deviation**
Pre-test	3,20	0,50
Post-test	3,34	0,40

Note. Significance was tested for a $p \leq 0,05$. None of the results were significant.