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APPROACH TO STUDY AS AN INDICATOR OF THE QUALITY OF TEACHING AND OF LEARNING ENVIRONMENT: THE CONTRIBUTION OF JOHN BIGGS

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This review investigates the contribution of John Biggs in playing an important role within learning research and educational system quality. Schools and Universities have gradually structured their policies on the bases of their students' perceptions, satisfaction, and needs. The interest in the measurement of student's study strategies and perceptions is the result of the needs for educational institutions to demonstrate their effectiveness in teaching. Biggs's model conceptualizes the learning process as an interactive system of three sets of variable: the learning environment and student characteristics, students' approach to learning, and learning outcomes. By exploring findings from educational studies, the review seeks to examine the evolution of Biggs's learning model and his contribution to understand individual, interpersonal and contextual factors that determine effectiveness of learning.

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1 Introduction

Considered one of the most notable figures in the field of learning and educational processes, John Biggs, by gradually developing his model, has influenced over the last thirty years the learning and teaching assessment systems still used today. His early studies date back to the early '70s, when Anglo-Saxon and northern European scientific literatures started showing a growing scientific interest in the description and measurement of students' study strategies. This interest was driven by the need to improve the teaching policies and the quality of educational systems, a need due to both the increased competition between schools and universities, and the importance of institutional training as key factor to demonstrate teaching efficiency and effectiveness and obtain funding (Entwistle & McCune, 2004; Barattucci & Zuffo, 2012). His studies sparked an extensive debate on the construct known as approach to study or approach to learning (Webb, 1997; Entwistle, 1997; Ekeblad, 1997; Beattie, Collins & McInnes, 1997; Kember, Wong & Leung, 1999), on measurements of approach to learning and on the development of the theory of Student Approaches to Learning (Biggs, 1993a), which is considered the central framework for the systemic conceptualization of teaching and learning (Biggs, Kember & Leung, 2001).

2 The origins of Biggs's interest in learning processes

Biggs's early research in learning theory dates back to the late '60s. His first theoretical model of learning process was clearly influenced by cognitive psychology and integrated with the emerging research area related to the information processing theory. According to his model, the information processing system was affected by emotional factors (arousal). In the wake of a growing interest in personality and motivational factors influencing learning outcomes, Biggs developed a questionnaire (Study Process Questionnaire, SPQ) in order to measure the emotional variables, such as anxiety and motivation, implicated in the study process (1970a; 1970b). The first version of the questionnaire was handed out to a group of students, together with a personality test battery and a comprehension task. Biggs hypothesized that factors such as cognitive style, personality and student's values would influence the coding process and information retrieval. In his immediately subsequent studies, Biggs began to broaden his interest to contextual variables such as the student's sociocultural background (Biggs, 1972), the assessment system used by teachers (Biggs, 1973), the type of subject studied (Biggs, 1976), noting that some environmental variables had an important role in the choice of specific study strategies and in study performance. Nevertheless, with the development

of a qualitative research aimed at analyzing the study behavior in natural environments (Marton & Säljö, 1976a), the learning models derived from the Information Processing Theory (IP) showed their limits in taking into account the influence that the characteristics of the study environment could have on learning strategies. While the IP models and studies focused on how much the student has learned (in terms of amount of information retained in memory after exposure to the input), many researchers began to focus their studies on how students learn and on the processes by which a student meets the specific task requirements. While Biggs was extending his interest into learning contextual variables, Marton and Säljö (1976a) led a qualitative research, which required controlled environmental conditions and dealt with the methods and study strategies that students implemented to face learning tasks given by teachers. Students were asked to read a scientific article and to prepare to answer some questions. The instructions were purposely ambiguous in order to encourage students' self-organization and learning strategies. After the analysis of the results of the interviews and of the comprehension task, Marton and Säljö hypothesized two main types of study strategy or approach to the task: the deep approach and the surface approach. Students with a surface approach to study were motivated by the main goal, namely memorizing information to succeed in the memory test, and were focused especially on the literal aspects of the text, omitting the real meaning and favoring in this way retention with neither personal contributions nor critical analysis. On the contrary, students with a deep approach showed a study strategy that clearly focused on the understanding of the meaning and that was motivated by the aim to obtain not only a content storage, but also a personal abstract of the text. The differences in these study strategies derive from the different information processing levels and different understandings of the nature of the task (reading to memorize versus reading to understand); in fact, deep approach was associated with the intention to comprehend, whereas surface approach with the mere will to store information. The coexistence of differences in intention and study process led the authors to identify them as approaches to learning, namely methods to interpret the task requirements as they are presented in a specific context. In a further study (1976b), Marton and Säljö showed that the choice of a deep or surface approach could depend on the student's "expectations" about the task requirements. When they were asked questions that required a mere repetition of content, students tended to implement a surface approach to the material. On the contrary, when they had to face questions that involved an accurate textual analysis, some of them opted for deeper strategies. Therefore, students chose approaches to study according to their expectations about how to carry out the task. At the same time, other authors responded to these studies by elaborating definitions of various approaches to study that are totally comparable with

those provided by Marton and Säljö. Pask (1976) conceived a holistic approach, aimed at general understanding, and a serial approach, aimed at the organization of the material. Similarly, Svensson (1977) elaborated a holistic and an atomistic approach, where the former was aimed at understanding and the latter at making the learning materials more effective in preparation for the memory test. Even studies related to the IP had described two types of learning styles, one called fact retention or information retention strategy, and another known as elaborative learning or processing learning (Schmeck, Ribich & Ramanaiah, 1977). The choice of the study strategy was influenced by some factors, such as motivation, nature of the input and amount of time available to process information, whereas the influence of environmental variables was not considered at all. Because of his interest in environmental factors and context, seen as independent variables that influence learning styles, Biggs goes beyond his experience in the field of IP and embrace more ecological studies that can be generally related to the natural study environment.

3 The evolution of Biggs's theoretical models

Biggs's first explanatory model of study performance (1978) reproduces, with some changes, Dunkin and Biddle's model (1974), which originally pertained to teaching processes and hypothesized three factors influencing the study process: predictive variables (presage), process variables (process), performance variables (product). According to this first model, the interaction between personological and environmental variables entails the activation of specific study strategies that can determine study performance. Specifically, among the predictive factors of performance, there could be individual characteristics such as cognitive style, intelligence, personality and sociocultural background, as well as environmental features encountered by the student, such as course design, assessment systems, teaching methods and study subjects. The interaction between the student's characteristics and the learning environment originates a complex set of values that affects the learner's study experience and identifies goals, reasons and motivations behind his study behavior. Motivations (motives) play a key role in generating consistent study strategies that will influence study performance. Thanks to the factor analysis of the results collected during the first SPQs (Study Process Questionnaire) (Biggs, 1970a; 1970b), Biggs identified three macro profiles or approaches to study (utilising, internalising, achieving). These included three distinct types of motivation related to the different study strategies. With regard to values, the first profile (utilising) is characterized by pragmatism and study is seen as a task to accomplish and overcome in order to pursue the study career. In addition, with regard to motivations behind study, this profile shows

some concern and relies on functional strategies to achieve the bare minimum needed and reproduce the material. With regard to values, the second profile (internalising) is distinguished by interest in personal growth, powerful intrinsic motivation behind learning, deep study strategies, personal text processing and critical ability to compare and correlate the various notions studied. The third profile (achieving) is definitely result-oriented and is typified by a lack of interest in personal growth and the use of opportunistic strategies aimed at achieving the highest performance. The strategies utilising e internalising, which are related to the first two profiles, substantially correspond with the surface and deep approaches identified by Marton and Säljö. Whereas, in the theories derived from the IP, study strategy is conceived as a top-down process where the cognitive component affects the motivational one, in Biggs's theory approach to study becomes a bottom-up process, in which affective component and context influence the cognitive response to the task. In the evolution of the model proposed in 1987, Biggs defines more accurately the variables involved in learning (Figure 1).

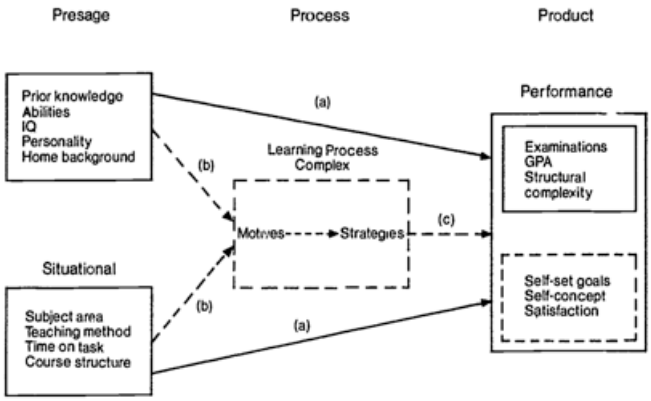

Fig. 1 - Biggs's 3P model of learning (1987)

In the process variables there are motivational and strategic components of study, whereas regarding learning (product) variables, Biggs talks about both objective variables of study performance, such Average test score, and subjective variables such as course satisfaction. The 1987 model still reveals a linear concept of the relationship between the factors involved in the determination of study performance, where predictive elements act affecting the process features that, in turn, influence the learning outcomes. This concept has been gradually modified since 1993, when it turned into a systemic representation of the processes involved in learning that underlies the adoption of a new model

describing the whole study environment. Biggs (1993a) proposes comparing the college training with a macrosystem composed by four main microsystems. The first is the student microsystem; the second is the classroom system, which includes teachers, educational facilities and teaching context; the third is the institutional microsystem, composed of departments and faculties. Each subsystem can implement, encourage or impede student learning. The fourth subsystem, called college community, can influence institutional and classroom systems. In this new systemic approach, Biggs (1993b) includes the revision of his linear model and hypothesizes that a particular approach to learning is influenced by the interaction between personological and many contextual variables within a specific educational ecosystem (Figure 2) (Biggs, 1999). The model assumes that learning outcomes are determined by several factors interacting with one another.

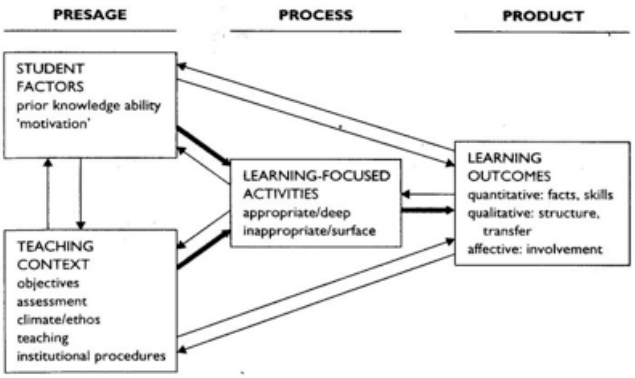

Fig. 2 - Biggs's 3P model of student learning (1993)

Just like the previous ones, the 3P model consists of three groups of variables involved in the learning process: predictive variables (student's characteristics and educational context), process variables (approach to learning) and product variables (outcomes). With regard to the predictive variables, we can see that the student's individual characteristics include information processing skills, personality, age, prior knowledge in similar or preparatory subjects, prediction of success, motivation (Biggs & Telfer, 1987). The characteristics of the educational context include environmental variables such as course and exam design, teaching and assessment methods, type of exams, teachers' beliefs about teaching and students (Biggs & Moore, 1993). Compared to the previous models, the division into groups of variables (predictive, process, product) involved in the learning process, is neither strict nor unidirectional. In fact,

not only changes in predictive variables can determine changes in approach to study and, as a result, in outcomes, but outcomes, in turn, can affect the subsequent learning experiences and can act backwards by influencing process and predictive variables.

4 Learning and Teaching

Biggs describes this new model as a model of teaching and learning (Biggs, 1999). This description introduces something new and represents a reversal in the theorization of the processes related to learning in college contexts. In fact, since the students' study performances depend on the characteristics of the learning context, the model will be able to provide a theoretical framework that will be useful to understand the teacher and teaching systems and their effects in terms of learning outcomes. The situational factors are called "teaching context factors", namely factors related to teaching context. This expression refers to what should be taught and how it should be taught and assessed, to teacher's experience and to classroom and institutional climate (Biggs, 1999). The three components of the teaching system that can influence the most the quality of learning are study content, teaching method and assessment system of student learning. With regard to these elements, Biggs introduces the concept of alignement, namely compatibility between the components of the system. The components of the teaching system not only have to be effective and of good quality, but also must be compatible with one another. In order to work properly, the various components of the college educational system (curricula, teaching methods and assessment procedures) should be aligned, namely consistent and aimed at achieving common goals that focus on the student. The presence of imbalances in the system could generate "breaks", namely the student perception of an unproductive education, the adoption of a surface approach, the presence of dashed expectations or teaching practices that are at odds with the syllabus. The concept of learning environment as a set of variables influencing the approach to study derives directly from Biggs's definition of teaching effectiveness. Effective teaching does not depend on the learner's identity, considering that the quality of learning is not completely related to the student's prior skills. It is not even fully affected by what the teacher does, since the adoption of a teaching method that proved effective in another context is not enough to predict positive outcomes. The indicator of teaching effectiveness is represented by what the student concretely does, namely by the outcomes he perceives and achieves. The model includes an additional element of innovation, namely the division of learning outcomes into quantitative outcomes (how much the student has learned), qualitative outcomes (how the student has learned) and affective outcomes (students'

attitudes towards their study experience and level of engagement in college life), which is expressed in terms of satisfaction and perception of the development of cross skills. These outcomes are relatively stable. They can influence the subsequent learning experiences and can act backwards in the model by influencing process and predictive variables. Students interpret the teaching context according to their concepts, experiences and motivations and organize their study through meta-learning, monitoring, planning and assessment skills (Biggs & Moore, 1993). The student will choose a (deep or surface) strategy that will be determined specifically by the way he perceives the requirements of the learning environment. Therefore, teaching methods can determine changes in how students perceive the learning environment and this element, in turn, could influence the adoption of specific approaches to study.

Conclusion

Despite the presence of many paths to the conceptualisation of learning, 'approaches to learning research' leads to a broad range of studies and institutional interest. The quantity of research in the area of learning style and learning strategies leads to the diversity of the disciplines and domains in which the research is conducted, with fragmented and disparate topic (Cassidy, 2004). Because learning style has been the focus of such a vast number of research and studies in the area, there exist a variety of definitions, theoretical positions, models, interpretations and measures of the construct (For a review: Cassidy, 2004). Within these learning theories, Biggs' model and the deep/surface dichotomy were defined as stimulating and suggestive, but receiving, at the same time, many criticisms. Some authors underlined significant issues relating to the model's supporting evidence and conceptualisation (Howie & Bagnall, 2013). The language is considered ambigous (familiar and non-technical), while the model is found to be underdeveloped and circular, with a lack of definition of the structure (Haggis, 2003; Marshall & Case, 2005; Heikkilä & Lonka, 2006). From a practical relevance point of view, the 3P learning process model supports a systematic control of teaching quality and its assessment, of environmental variables, and learning outcomes. It's through the methodologies developed by this model that a large number of universities are monitored and evaluated, in order to ensure increasing learning standards, obtain fundings, and contend for students in an internationally competitive market. In Biggs's models, approach to study is one of the components of the educational system, including both teaching and learning. It also represents effectively an important overall indicator of the quality of the system; in fact, it can reveal if the educational system works or not (Biggs, 1993a). The concept of approach to study, conceived in the wake of Marton and Säljö's research

(1997) and in line with the results of other authors (Pask, 1976; Svensson, 1977; Entwistle, Hanley & Hounsell, 1979), became the basic construct for the development of Biggs's theory of Student Approaches to Learning (SAL) (1993a). Nowadays, thanks to its centrality and specificity, this theory is a framework for the systemic and constructivist conceptualization of teaching and learning (Biggs, Kember & Leung, 2001), that could fit several learning environments (Barattucci & Zuffo, 2012; Barattucci *et al.*, 2017). The strength of the construct approach to study lies in the fact that it is focused on a set of factors influencing the quality of learning, such as learning and teaching environment, types of teaching and assessment, and the related students' perceptions (Prosser & Trigwell, 1999; Ramsden, 2003). The adoption of specific learning strategies is affected not only by personological variables, but also by contextual variables such as the learning environment. Approach to study is considered both a critical factor influencing educational performance (Minbashian, Huon & Bird, 2004) and an important predictor of students' perception of a supportive learning environment. The latter, in turn, is a variable that can modify learning outcomes (Trigwell, 2006; 2012; Trigwell, Ashwin & Millian, 2013). Consequently, several educational institutions showed a growing interest in paying attention to how study environment affects students' perceptions and the value they attribute to it. This attention responds to the desire to improve the educational systems, due to the impact they have in creating representations of positive and supportive environments (Ramsden, 2003). The adjustment of educational systems centered on Student Focused Learning (Prosser, 2004) has become a strengthened and recognized aspect of the activity of successful educational systems (Biggs & Kirby, 1984). The relationship between students' perception of learning environment, their learning approaches and (quantitative and qualitative) outcomes are central in the field of education. It is through the understanding of perceptions students have of themselves and the learning context that it becomes possible to interpret the variations in study results and act on learning environment, in order to obtain the best approach to study.

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