

A SOCIAL SECURITY SYSTEM'S SUSTAINABILITY PERSPECTIVE ON THE SYNCHRONIZATION OF TEACHING- LEARNING MECHANISMS AT TERTIARY LEVEL OF EDUCATION.

VICTOR-BOGDAN OPREAN

THE WEST UNIVERSITY OF TIMIȘOARA

BABEȘ-BOLYAI UNIVERSITY OF CLUJ-NAPOCA

58-60 Teodor Mihali St., Cluj-Napoca, 400591 Cluj, victor.oprean@gmail.com

Abstract:

Our main objective is to determine as a primary hypothesis, whether Romanian education is circumscribed to international tendencies in general, and European trends in particular. Education was considered mainly in terms of the types of knowledge which have to be transferred, and subsidiary seen from the point of view of the adequacy of transmitting technics. Also, we attempt to orient the focus predominantly to the tertiary education; as a basic hypothesis it was considered that the education outsourcing is most effective when the recipients reach the level of developing specific abilities which are readily applicable in practice, and ascribed to the most distinct field over the time of personal formation and individual becoming (as seen alongside philosophical Aristotle delineations).

Key words: Business, Education, Teaching methods, Technics' suitability

JEL classification: I21

1. Introduction

The premises were selected in view of the relationship between education and migration (Oprean, 2012). It presumes that personal, individual decision on the future transition to the economically active life period dictates current decisions regarding the educational pathways. Moreover, the individual premises for a decision on migration are met, after own considerations on sufficiency and optimal level of the educational act as seen from the perspective of material and professional chances to personal fulfillment. Thus, the assumption we used was that the sufficient knowledge accumulation is perceived, and the propitious moment for the temporal balance (time dedication) from the accelerated personal intellectual development towards material and professional accomplishments, is when completing the tertiary education.

Learning theory (cognitivist) first envisioned and developed by Jean William Fritz Piaget (1896 - 1980) assumed that humans generate knowledge and understanding through sequential development of individual cognitive abilities as reconnaissance processes, memory, analysis, reflection, application, creation / creativity, understanding and evaluation. Cognitivist learning involves the adoption of techniques, procedures, organization and structure for the development of internal cognitive structures that would strengthen synapses in the brain. Education intervenes in the development of conceptual knowledge, techniques, procedures and solving algorithmic problems in order to assist those who need the background to the acquisition and integration of new knowledge. The development of thinking schemes and adopting knowledge implies a platform based on both human interaction and the environment. The ability to learn is explained by Piaget as directly related to children's intellectual development stages (described by him), stages by which are built features that lead to a particular type (particularly specific) of thinking.

Following criticism, adaptations, changes and developments in cognitive theory has emerged a new position used in current approaches that knowledge logic (previously seen as the only nexus to acquire knowledge) are distinct from conceptual knowledge (declarative) and the procedural one (Cauley 1986).

Teaching and learning based on problem solving (PBL - problem based learning) occupy large spaces in academic preoccupations. From a historical point of view, these methods have been mostly placed in the context of the effects they produce. It has been shown in specialized literature that a problem-based learning curriculum has positive and consistent effects in terms of skills, abilities, competencies (skills, know-how, applied knowledge, procedural knowledge) of subjects (students) but is not of a great success on acquisition and obtaining of declarative knowledge (descriptive, propositional, which are by their nature expressed in sentences, affirmative statements, assessor, declarative or indicative proposals – which is part of a priori knowledge obtained without observation, interaction or direct application). In other words, students learn better to do better what they are asked, to solve situations, develop their skills, types of know-how, but less well to personally orient their own cognitive processes (i.e., better know "how" , but less "why").

In addition to studying issues, cognitive measures, the effects of teaching methods on the type of knowledge acquired (general knowledge / skills or descriptive) in the relevant literature we took into account is questioned the issue of institutional influence on problem-based teaching method. Thus, learning outcomes have been described as directly related to curriculum or academic program in a general (comprehensive) view, describing the ways in which college (undergraduate program) affects students, paying particular attention to generic results of training, such as the progress of the study and its sequel (towards graduation). The reference framework of the experience of students in the undergraduate program was described by two concepts: institutional experience (involving education) and academic and social integration. Previous research has shown that students who "feel at home" participate in extracurricular activities and feel connected with colleagues and teachers and have a greater propensity towards continuation and successful completion of studies. Without social integration, ongoing studies are hampered and, finally, is questioned even completing their graduation. Natural integration involves both an academic issue and a social one as the willingness and ability of someone belonging to a group also depends in part on its ability to fit the educational level assumed. The concepts of social and academic integration are incumbent of an important distinction to be made between formal and informal integration, each important for the integrating whole. Formal academic integration involves contacts about the study and institution itself, while informal involves sustained contact between teachers and students outside the direct context of academic learning environment. Similarly, at level of social integration, formal integration involves firstly contacts between colleagues about school activities they have undertaken. Such contacts are often circumscribed by collaborative work (e.g., solving issues, home works and projects together). This formal level is distinguished from the informal, which is characterized by factors such as frequent contacts and participation in student activities. Even though the model assumes a direct link between institutional experience and continuing education, there are not clearly identified the processes by which the institutional experiences influence learning, and are not reached issues that involve social and academic integration. However, the academic debates at length the direct link between institutional experience (or learning environment) and the quality of learning. Generally, the basic model expresses that previous attributes to student experiences are transferred in assuming goals which, given the institutional experience (activities undertaken as students), lead to a certain quality of student efforts and ultimately, their persistence in the educational act.

2. Methodology

Teaching methods in general were studied based on relevant papers from academic journals. The selection was made by the highest impact factor and subsidiary by the complete content accessibility. Dedicated search engines were used for the variations of mainly “method” and “teaching”, and “learning” and other with secondary relevance. We conducted a partial content analysis of Journal of Higher Education (JHE) edited by Ohio State University Press, Journal of Geography in Higher Education (JGHE) edited by Taylor and Francis, Research in Higher Education (Journal of the Association for Institutional Research) (RHE) and Higher Education (The International Journal of Higher Education Research) (IJHER) the last both edited by Springer. The content analysis found primary orientation to educational institutions/educational management, recruitment, admission, retention and transfer for JHE and RHE respectively, for particular teaching areas (JGHE) or to cultural areas (JHE – USA), which is why we selected the journal we found having a stronger orientation towards teaching methodology, without a defined cultural orientation and field of application on which the research to be centered. In the selected articles we initiated the first research level of fundamental teaching methods investigated and relevant for the current period considered of the past ten years; the second research level involved identifying the literature that formed the basis of the findings described. After taxonomic framing of the goals depending on the type of knowledge that are intended to be transferred to students, applicative and predicative respectively, we proceeded to identifying in the content of the articles the teaching/seminar methods oriented to the first type and then to the second type of knowledge. From the first category of methods we selected the problem-solving, and for the transition to predicative (declarative, conceptual) knowledge transfer we tried to apprehend the assisted self-explaining and reasoning methods of teaching/seminar based on open-ended questions and formulating arguments.

3. Teaching options at tertiary level

A research well suited for our purposes, on which we grounded our reasoning, explores the effects of teaching method based on questioning on the social-academic integration and research progress (Severiens and Schmidt 2009). The research methodology is based on the completion of a questionnaire on social and academic integration by 305 students in the first year of study at tertiary level, involved in three different study programs in psychology. To study the effects of teaching methods, a working environment / learning was selected, based entirely on problem solving (PBL – Problem Based Learning) and this environment was compared with 1. The effects of a conventional courses-based environment, and 2. The effects of a learning environment based on a combination of traditional courses and other methods aimed at "enabling" students. Following the Lisrel analyzes applied to the data, it is observed a direct and positive effect on the progress of study for students enrolled in the PBL working environment compared to students trained with more conventional learning methods (PBL students achieved more credits compared to the others). PBL stimulates students towards cognitive skills development (abilities) and in addition, the social and academic integration levels were also higher among students involved in PBL curricula. Links between integration and study progress were less direct; similar results were obtained in other studies on PBL curriculum based and stimulate students to acquire knowledge (not shown stable differences between PBL and conventional educational curricula concerning the accumulation of declarative knowledge). Formal social integration positively affected the progress of studies, but informal academic integration was negatively correlated with it. The central study indicates that students engaged in a

PBL-based curriculum shows high levels of superior social and academic integration, being more satisfied with the quality of formal and informal contacts with teachers and also the formal one with peers. These results confirm other studies according to which activating learning environments foster social integration of students.

However, the higher score on feature was related to academic integration of PBL, the more so also assumed that teachers who worked in the PBL to do, in most cases, an effort to know students, taking them seriously and invite their profession. This is no doubt related, as the authors of the study pointed out, to the fact that teachers and tutors and especially small groups of students met several times a week in meetings related to PBL. Seminars/laboratories activities therefore include related, even if subsequent to the originated PBL factor, independent and different than the pure method analyzed. These having an informal character presumed by knowing the students and other direct activities, of personal character, cannot be (and haven't been) placed by the authors in the coverage of problem-based methods and, therefore, positive effects cannot be entirely awarded to a greater or lesser share of it. The authors stress however that other curricula of "combined" education (which were used as a basis of comparison), provides a considerable amount of methods for learning activation, but that the system based on PBL resulted in obtaining the highest number of credits. (Severiens and Schmidt 2009)

Linked to the progress of students as a result of the learning environment, the study demonstrates a direct effect, consistent with results obtained in other studies that examined the activation and cooperation in learning environments, PBL having apparently more success in stimulating students to obtain loans. This progress seen in relation to integration revealed two out of four significant connections. Thus, formal social integration (students cooperating well with colleagues make friends, feel familiar in the educational institution) affects the progress of the study, a fact also correlated with other studies that have shown that social integration is an important predictor of learning success / study. Unexpected for the anticipated results, the link between informal academic integration (outside the classroom or on matters of a personal nature) and the progress of studies proved to be a negative one.

Another type of research is relevant for that the knowledge that is intended to be transferred (specific to the business and to some extent the economic field in general), because they presuppose the existence of prior knowledge grounded in economics such as market research and understanding the concept of enterprise and operation to achieve the objectives, economic pricing mechanisms and cost etc.. The students may come from educational backgrounds that have not involved a relevant corresponding previous accumulation, which could lead currently to a "loading" / burden cognitive which further can restrict the possibilities of accumulation and development of conceptual understanding or knowledge. This charge can be avoided if the teaching / educational methods are adapted to the potential students so that they progress closer to the optimal both the relevant well-grounded prior knowledge students and students who have recently accessed the profession. Propositional knowledge, alongside cognitive load and conceptual understanding are approached in terms of their effects on four training methods applied to students with low prior knowledge that major in statistics.

Unlike other orientations that focus only on a particular type of knowledge (propositional or procedural), this work is useful in adapting the techniques of teaching / learning / instruction having regard to knowledge transfer from the procedural into propositional / conceptual.

Such areas like the one addressed in our approach, e.g. economic analysis, valuation and business assume at least initially the existence of abstract knowledge, cumulative in nature (each "unit" of further knowledge presupposes the pre-existence of

knowledge that is related). In other words, the process of drafting (personal) knowledge uses prior knowledge to structure and integrate new information; self-explaining and reasoning are well known processes that realize these processes of knowledge development. These processes require, dictate the level of cognitive "loading" (burden), while the working memory / cognitive ability, learning, is limited both in volume and the time which can be allocated. Under these conditions the training methods become very important in areas where working memory tends to becoming overloaded and thus slow or no accumulation due to processing new information elements consciously, in an information (field) where knowledge is not only complex, interconnected too. Load theory / of cognitive load implies that existing knowledge structures in long-term memory is essential to avoid overloading memory and learning processes orientation respectively. Given the strong connection with our current preoccupations, in the followings we gave it (Leppink et al. 2012) a closer look in trying to assess the synchronization of our teaching methods with the assumed estimated cognitive loading pertaining to the respective field(s).

4. Suitability of teaching technics

The cognitive load theory is based on the previously developed demonstration (Miller, 1956) on the limits of human capacity for processing information. This demo includes three major observations. First, the coverage / the extent of absolute reasoning (judgment) and of the immediate memory impose severe limitations on the amount of information that people are able to receive, process and remember. By organizing simultaneous and successive of entry stimuli in multiple dimensions (through teaching - learning), in sequences of parts (pieces of information, information chunks), information blockage can be avoided (or at least streamlined of the information 'circulation'). Secondly the importance of, recoding information process is highlighted in human psychology, particularly linguistic coding process behind the thought processes. Thirdly the concepts and measures proposed by information theory propose a quantitative way to address the questions raised by the access to knowledge; this theory provides a benchmark for calibrating material stimulus (teaching techniques in our case) and for measuring the performance of the subjects (students).

The parts, pieces of information ("information chunks" defined or targeted by Miller) to be transmitted are considered differently depending on the discipline / field and in terms of subjects (students) the difference is given by prior knowledge / knowledge structures available already in long-term memory structures. The cognitive load level contains three types of tasks / loads that are supposedly additional: intrinsic, relevant / pertinent / related to prior and external (foreign, "extraneous" data) knowledge. Thus, the type of informational loading must be correlated by the methods that match the students' prior knowledge, because intrinsic knowledge is or depends precisely on this prior knowledge of students, but crucially depends on the complexity of issues / tasks / tests that are subjected to or need to resolve. The charge with close, relevant knowledge, arises from the characteristics, specific elements of teaching / training / education that stimulates the cognitive processes conducive to learning while learning characteristics considered not to be beneficial for learning are those which propose external information (completely new to student, even if related to the field / area but unrelated to his previous knowledge). In other words, through the teaching methods must be used to maximum the intrinsic knowledge (which enhances new information relevant by features / implicit typology of teaching methods) and minimized the introduction of charges, new loads foreign / external, to avoid cognitive overload. Minimizing the teaching of foreign tasks and calibration with the intrinsic, pre-existing knowledge, students are directed to making their own knowledge through self-explanations and reasoning, thus imposing almost implicitly the development of

new, relevant knowledge, which are related, connected with prior knowledge. Although self-explanation requires significant allocation of time, if students are given enough time, learning through self-explanation is more efficient than through observation, investigation and hypermedia (efficiency studies is interpreted in terms of learning outcomes and cognitive load) as it encourages, puts the emphasis on activities that produce load of prior knowledge that is related and relevant. Also, self-explanation is more effective when it is determined, predetermined-coordinated than when there is only spontaneous initiative of the student. However, guiding or assisting self-explanation through means implied by the method of teaching through open questions (involving developing response) is more effective than simply assisting self-explanation. Explanation for this effect is that when students are not guided into the self-getting the response, it is required that before engaging in reasoning processes, to look themselves for relevant topics on which to structure thinking (thinking scheme, "the scaffolding" in Piaget's theory), which can easily lead to disorientation and therefore to less efficient learning; because the guided students do not have to search the relevant reference topics, they gain time, energy and cognitive capacity available for reasoning and self-explanation.

Even if self-explanation could be effective for some students, the question is whether beginning students have enough prior knowledge and reasoning skills to learn from self-explaining topics (learning objectives) proposed. For students with previous insufficient knowledge becomes a priority, predominant, the cognitive load with intrinsic information when they are guided in educational applications designed to support the development of knowledge. In this case, of the load with intrinsic knowledge, any additional cognitive activity induced by self-explaining guiding can lead the cognitive load to the limit of working memory, which leads further to cognitive overload. From this point of view, previous studies on learning from worked examples have shown that students with incomplete or partially incorrect prior knowledge learned more from studying worked examples (such as, for example, case studies and problems solved with given solutions) than from problem solving or their own thinking of the steps that would lead to solution. Explanation for this is that the lessons with intrinsic high load, problem solving requires high load of new knowledge, external, foreign to beginning students in the field (i.e. what intrinsic knowledge is to prepared students, ready to be applied, for beginning students is foreign information that must be assimilated first in order to be applied). In such circumstances, people tend to solve new problems by searching for similar problem solving for which both the steps and solution are known and thus guiding their own solution applied to new problems. Solved examples can guide students in order to self-explain, but it depends on both the prior knowledge and the scheme examples and instructions in the examples if students, really learn from them. Lessons, courses, seminars aimed at introducing new relevant, related knowledge, can achieve their goals if they are located at an appropriate level of difficulty for the student. Thus, in the presence of rich prior knowledge the examples solved become redundant and solving problems is superior. When students are able to self-explaining, the induced explaining by the teachers through solved examples lead to external load, foreign information, instead of relevant, related knowledge for the student. In this case is produced an effect called in the literature " the reverse effect of expertise" that occurs when there is an interaction (collision) between prior knowledge levels and efficiency assumed by the different methods of teaching / seminar; this means that the teaching methods that are effective for students with low prior knowledge of the area may lose its effectiveness or even have negative consequences for competent students. (Leppink et al. 2012)

Other studies taken into account were considered relevant as they develop a theoretical model that can be used to assist teachers in developing and understanding

excellence in teaching at tertiary level. The research in Kane et al. (2004) started from an attempt to better understand the complex nature of teaching at tertiary level (universities) by identifying and investigating the attributes of a group of teachers considered excellent university science departments. Working with these teachers it was considered what they say about teaching and what they carried out in practice. The research confirms many aspects in the literature related to all three levels of education (primary, secondary, and tertiary) and highlights the strong connection between teaching practice and engaging in research of these excellent teachers. It also emerged the key role played by interpersonal relationships and "the person" teacher. It is proposed that the reflective practice oriented to goals (targets, education practice voluntarily oriented to achieving certain objectives) to integrate the multiple dimensions of teaching found in the target group.

In another orientation, Samuelowicz and Bain (2001) investigated typical ways of thinking about teaching and learning as well as proclivities (inclinations) of the interviewed teachers to teach in a special way. The methodology that they used was that of constant comparisons (Strauss and Corbin, 1998) used priorly as a base for the Constructivist grounded theory, applied to the transcripts of interviews with 39 teachers, to identify broad guidelines on teaching and learning; then these guidelines were reviewed to identify beliefs (considerations, opinions, judgments, faiths) in their distinct characteristics. The study falls taxonomically in the last ten years current of conceptualizing teaching and learning, including previous approach of the authors, in 1992, of the system that is presently restarted. Following the research an extended framework of academic teaching and learning considerations (beliefs) was proposed. It describes the seven guidelines along nine dimensions of quality considerations (beliefs, opinions, views). The current study has largely overlapped over the conclusions of a decade ago, but also resulted in important additions and adjustments. Concerning the differences between teaching and learning orientations focused on teaching and the one centered on learning, there were presented three types of evidences (quantitative analysis, hierarchical clustering based on this analysis and narratives of two teachers) to demonstrate that there are fundamental differences between them. The resulting data are mostly consistent with previously reported observations, but does not provide empirical support for the "transitional" Kember (1997) category, which would act as a "bridge" between the two major sets of guidelines.

5. Conclusions

Implications for teaching methods are somewhat obvious. For the development in the case of poor prior knowledge, teachers should be encouraged to use examples and case studies solved. However, once students have acquired a certain level of knowledge, developing knowledge by means of arguments impose a charge relevant in the relation with prior knowledge and at the same time it is reduced the total cognitive load. Therefore, methods based on examples are a good start but as soon as the students will have acquired the necessary knowledge, it is almost mandatory to change the method to stimulate the self-explaining concepts and ideas and integrate them into arguments aimed at solving complex situations. Further, as students develop increasingly the conceptual level of understanding, they gradually have lesser and lesser need of active guidance present in teaching / seminar methods when they solve some complex problems or may be led into more complex situations. Depending on the objectives of the course or seminar, a combination of self-guidance and problem solving without guidance could be applied during the examination. At tertiary level, the education in the Romanian economic field relies heavily on teaching technics involved in the transfer of predicative knowledge. These, together with the secondary emphasis on the applied study of foreign languages in the respective focus fields, give the international

applicability of education (Oprean, 2012) which in turn as a consequence, nurtures migration and the education outsourcing.

Acknowledgements: This work was supported from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/59184 „Performance and excellence in postdoctoral research in Romanian economics science domain”

BIBLIOGRAPHY

- [1] Albanese, M. A., & Mitchell S. (1993): *Problem based learning: A review of literature on its outcomes and implementation issues*. Academic medicine: Journal of the Association of American Medical Colleges, 68(1), 52–81.
- [2] Cauley, Kathleen M. (1986): *Studying Knowledge Acquisition: Distinctions among Procedural, Conceptual and Logical Knowledge*. Paper presented at the Annual Meeting of the American Educational Research Association, 67th, San Francisco, CA. U.S. Department of Education, Office of Educational Research and Improvement, Educational Resources Information Center (ERIC)
- [3] Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003): *Effects of problem-based learning: A meta-analysis*. *Learning and Instruction*, 13(5), 533–568.
- [4] Kane, R., Sandretto S., Heath C. (2004): *An Investigation into Excellent Tertiary Teaching: Emphasising Reflective Practice*. *Higher Education*, 47(3): 283-310; Article Stable URL: <http://www.jstor.org/stable/4151546>
- [5] Leppink, J., Broers, N.J., Imbos T., der Vleuten C.P.M., Berger, M.P.F., (2012): *Self-explanation in the domain of statistics: an expertise reversal effect*. *Higher Education* 63:771–785. DOI 10.1007/s10734-011-9476-1
- [6] Miller, G. A. (1956): *The magic number seven plus or minus two: Some limits in our capacity to process information*. *Psychological Review*, 63, 81–97.
- [7] Oprean, Victor-Bogdan (2012): *Sustainability of the Romanian Social Security System. The Burden of Education*. MPRA Working Paper, RePEc Archive, ID 41432, <http://mpa.ub.uni-muenchen.de/41432/>
- [8] Samuelowicz K., Bain, J. D., (2001): *Revisiting Academics' Beliefs about Teaching and Learning*. *Higher Education*, 41(3): 299-325 Article Stable URL: <http://www.jstor.org/stable/3447978>
- [9] Severiens, Sabine H., Schmidt, Henk G., (2009): *Academic and social integration and study progress in problem based learning*. *Higher Education*, 58(1), 59-69. DOI 10.1007/s10734-008-9181-x
- [10] Strauss, A., Corbin, J. (1998): *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.
- [11] Tinto, V. (1997): *Classrooms as communities. Exploring the educational character of student persistence*. *Journal of Higher Education*, 68(6), 600–623.
- [12] Tinto, V. (1998): *Colleges as communities. Taking research on student persistence seriously*. *Review of Higher Education*, 21(2), 167–177.
- [13] Vernon, D., & Blake, R. L. (1993): *Does problem-based learning work? A meta-analysis of evaluative research*. *Academic Medicine*, 68(7), 550–563.