

**International Journal for
QUALITY IN HIGHER EDUCATION INSTITUTIONS**

Year 2014, Vol. 1, Nr. 1

Journal website:

<http://www.quality.uaic.ro/index.php?page=revista&detail=despre&lang=en>



**ADAPTIVE VERSUS GENERATIVE LEARNING IN ECONOMICS AND
BUSINESS ADMINISTRATION HIGHER EDUCATION**

Alexandra Luciana Guță¹

Abstract

Education is one of the pillars of the knowledge society. Considering the case of higher education, the aim of this paper is to analyze whether adaptive or generative learning is more frequently promoted. The main research goals are to analyze the teaching and assessment activities in terms of methods used by professors, whether professors are more inclined towards promoting adaptive or, on the contrary, generative learning and what the implications of promoting these types of learning are. For undertaking the research, we have used primary data collected through an online questionnaire applied to teachers from 11 Economics and Business Administration faculties from five universities in Romania. The results will include an assessment of the situation in the teaching activity in terms of adaptive and generative learning. The research results highlight that there is a moderate inclination from teachers regarding promoting generative learning. A limitation of the research comes from the fact that we have applied the questionnaire online, which might lead to problems of representativeness. The practical implications of the research come from the fact that, in the case of promoting generative learning, students are actively involved in the learning process. They learn how to interpret the information and how to use it in a way that generates added value, thus being better prepared to enter the labour market. The originality of the paper consists in the fact that this research is a pioneering one, being based on an instrument developed from conceptual notions.

Keywords: Adaptive learning, Generative learning, Higher education.

JEL classification: A22, A23, D83, I21.

1. Introduction

Universities and teachers are responsible for the development of the intellectual capital of those enrolled in higher education. We believe that generative learning is more useful than adaptive learning, because generative learning helps students to develop higher capabilities, which they can further use at work, hence the opportunity of undertaking this research. We explore adaptive and generative learning in higher education. The paper is focused on the fields of economics and business, in Romanian higher education, analyzing the teaching and assessment activities in terms of the methods used by teachers, and, respectively, teachers' tendency towards promoting adaptive learning or, on the contrary, generative learning.

¹ PhD. Student, Faculty of Economics and Business Administration, Alexandru Ioan Cuza University of Iasi, Carol I, no. 22, 700505, Iasi, Romania, luciana_guta@yahoo.com.

2. Adaptive and generative learning

Adaptive and generative learning are two types of learning that share a series of differences. The concepts of „adaptive learning” and „generative learning” are mainly used for organizational learning (learning within an organization), but they can also be applied in the case of individual learning. According to Chiva et al. (2010), generative learning means changing the mental models or perceiving reality through a different paradigm. Generative learning also means to be able to see beyond a certain situation or question the operating norms according to Argyris and Schön (1974). Adaptive learning applies to routine problems/solutions, and individuals primarily use their existing knowledge, in the detriment of developing new knowledge, according to Driver (2001, after Argyris, 1977). According to Freeman and Knight (2011), generative learning or double loop learning (we need to mention that these two types of learning are similar) can take place only if the learner is willing to learn. Double loop learning enables students to use their knowledge in order to create innovative solutions, according to Freeman and Knight (2011). This type of learning also involves challenging existing paradigms, and the individuals „disregard the constraints of the presented problem, examine the underlying assumptions and governing values” (Korth, 2000). Another aspect specific to generative learning resides in the fact that the individual who learns creates connections between the existing and the new information, knowledge and conceptions in order to generate a meaning for certain events, selective attendance to events being necessary for understanding complex topics (Lee et al., 2009, after Wittrock, 1992). If we refer to students’ assessment, examinations where students predominantly reproduce what they have learned is specific to adaptive learning or single loop learning; in the cases when students are invited to apply the information/knowledge that they gathered, through an assessment that is based on case studies, debate, reflective exercises, generative or double loop learning is taken into consideration (Freeman and Knight, 2011). According to Sharp et al. (2005), the “generative learning concept” in the case of individuals, students, and learners, in general, was developed from Wittrock’s work (1974, 1989, 1992).

“Proponents of generative learning argue that students, rather than professors, should be engaged in actively pursuing an understanding of course content by completing generative assignments that result in any concrete artefact, such as writing assignments, posters, graphs, or even computer-based simulations” (Sharp et al., 2005, p. 346; Grabowski, 1996). Sharp et al. (2005) state that, because of the fact that economics is rich in formulas and technical methods, education in this field tends to be centred on the teacher. The researchers also state that students could better understand economics “by complementing teacher-delivered rigor with student-centred pedagogy” (Sharp et al., 2005, p. 345, after Sharp, 2003). Sharp et al. (2005) mention that Jonassen (1988) has stated four categories of generative strategies for learning course content. The four categories are: recall, organization, integration and elaboration. We intend to focus on the last three ones because recall, as Sharp et al. (2005) assert, implies memorization of the course content. Organization is very useful when students organize the content of a course in a way that makes sense to them; when organizing, students tend to learn from their organizations because they are “rehearsing the information as they organize” (Sharp et al., 2005, p. 346). This strategy has two forms: a text based

form and a form based on graphical concept maps. Text-based organization includes, for example, “constructing outlines (organizing content with numbered points and lettered sub-points) and writing summaries (organizing content in paragraph form)” (Sharp et al., 2005, p. 347). Graphical concept maps include different types of graphics (spider maps, flowchart concept maps, hierarchy concept maps) and the different types of concept maps allow “students to manipulate information in specific and unique ways” (Sharp et al., 2005, p. 347). Integration refers at connecting the newly acquired information with students’ existing knowledge (Sharp et al., 2005). In the new information integration process, students construct “a personal understanding of course content” (Sharp et al., 2005, p. 348). Two common forms of integration are writing paraphrases and creating metaphors. By writing paraphrases, students integrate the content that is being learned „with their own language structures”, according to Sharp et al. (2005, p. 348). By developing metaphors, a medium that is necessary for understanding abstract ideas is created (Sharp et al., 2005). Elaboration is the generative strategy by means of which students can connect the new content that is being learned with “real-world events or examples” (Sharp et al., 2005, p. 348). Elaboration includes: “(1) requiring students to identify real-world examples and manifestations of course content, (2) predicting results and implications of policies or procedures, (3) synthesizing discipline-specific course content with content from other disciplines, and (4) inferring causes for outcomes” (Sharp et al., 2005, p. 348). An important detail when using different forms of this generative strategy is the fact that teachers should know and therefore take into consideration how to elaborate by “making connections to events and examples that are personally relevant and interesting” to students (Sharp et al., 2005, p. 348).

Another classification of generative learning strategies is the one mentioned by Grabowski (1996, after Wittrock, 1989). This classification comprises two types of activities, considered to be generative. The first type includes activities that are used in order to “generate organizational relationships between different components of the environment” (Grabowski, 1996, p. 901). These activities include “titles, headings, questions, objectives, summaries, graphs, tables, and main ideas” (Wittrock, 1989 in Grabowski, 1996, p. 901). The second type includes activities that “generate integrated relationships between the external stimuli and the memory components” (Grabowski, 1996, p. 901). This type of activities includes “demonstrations, metaphors, analogies, examples, pictures, applications, interpretations, paraphrases, and inferences” (Wittrock, 1989 in Grabowski, 1996, p. 901). Simple coding strategies include underlining, note-taking and adjunct or inserted questions, complex coding strategies include “creating hierarchies, headings, and sentence meanings, and mapping techniques” and manipulation of objects; integration strategies include imaging, elaborations and analogies (Grabowski, 1996, pp. 909-912).

Grabowski (1996, p. 897) highlights that Wittrock (1974) made a basic assumption – that “The learner is not a passive recipient of information; rather she or he is an active participant in the learning process, working to construct meaningful understanding of information found [...]” Thus, we can see that the theory of generative learning is based on the idea that the learner is actively involved in the learning process. According to Grabowski (1996), an activity can be qualified as being generative only if it involves meaning making. In order for different activities to be classified as examples of generative learning strategies, those activities need to involve creating relationships and meaning, as Grabowski (1996) states. The generative learning theory is composed of four

processes: motivation, learning, knowledge creation, generation (Grabowski, 1996, after Wittrock, 1992). It is considered that, if ignoring any of the four processes, this could result in a passive attitude from the learner, a mentally disengagement towards learning (Grabowski, 1996). In the model of generative learning, an effective instruction is “causes the learner to generate a relationship between new information and previous experience” (Wittrock, 1974 in Grabowski, 1996, p. 913). Lee et al. (2008) state that knowledge generation is the process that represents the essence of the generative learning model. Researchers also emphasize that the generative learning theory is focused on “selecting appropriate, learner-centric instructional activities for the learner”, its companion being generative teaching (Lee et al., 2008, p. 112). Generative learning theory refers to a “student-centric learning with specified activities for actively constructing meaning” (Lee et al., 2008, p. 122). Also, as stated by Lee et al. (2008), the theory of generative learning “does not assume learner or instructor or instruction dominance but rather a partnership in the process”. The researchers also conclude that “for generative learning theory, the *sage*, *guide*, and *learner* are in the centre” (Lee et al., 2008, p. 122).

Linking the concepts of adaptive and generative learning to education, and the latter one with the knowledge society and even the free society, we may say that education and, between the two types of learning, generative learning, are connected to the knowledge free society development. Universities are key institutions nowadays, being seen as both producers and transformers of knowledge, after Delanty (2002). Education has a significant importance to the development of the knowledge society and also of a free society. Pârgaru et al. (2009, p. 646) state that education is “the basis of a society oriented towards the future” and that knowledge is considered to be “the main component of the economic and social growth”. If we consider the fact that, while adaptive learning is based on existing knowledge, generative learning means generating new knowledge, it is easy to see that generative learning is highly significant in the development of a knowledge society. Although education does not seem to be directly connected to a free society, we can draw some possible connections between these two concepts. Cohen (1999, p. 20) has defined the free society through three key features in terms of a social and political framework. The first feature refers to private property and states that “private property is protected as inviolable”. The second feature refers to the fact that the role of a government is to prevent the violation of individual rights and to punish the violation of rights. The last feature refers to the fact that “all human relationships are voluntary”. We need to mention an idea that we find interesting and useful. Cohen (1999, p. 20) states that “free societies can exist in degrees.” Considering these aspects regarding the free society, we may state that education and implicitly, learning, might be able to foster, to develop a mentality that might enable the free society, respectively, to generate a higher degree of a free society.

3. Research methodology

In order to assess the situation in the area of education, in terms of adaptive and generative learning, for this study we have used primary data, collected through a questionnaire in an online survey. We have focused on the economics and business administration disciplines, in the case of Romania. Thus, the population comprises professors teaching in the economics and business

administration faculties in Romanian universities. The sample is formed from teachers from 11 economics and business administration faculties in five Romanian universities. The survey took place in April 2013. It included professors teaching in economics and business administration faculties from five major Romanian universities: “Alexandru Ioan Cuza” University of Iași (15.65% of the total number of respondents), The Bucharest University of Economic Studies (for objective reasons, only seven out of the total number of 11 faculties from this university were included; 26.96% of the total number of respondents), The University of Bucharest (3.48%), Babeș-Bolyai University (33.04%) and West University of Timișoara (20.87%). Considering that we applied the questionnaire by means of an online survey, we included all teachers whose e-mail addresses we were able to find on the universities’ websites because usually the response rates in online surveys are very low. The questionnaire was sent to a total number of 637 teachers from 11 faculties (seven faculties from The Bucharest University of Economic Studies and one faculty from each of the other four universities). We have received 118 completed questionnaires from 10 faculties, resulting in a response rate of 18.52%. We eliminated some answers (in the case of seven questionnaires), because they were either randomly or the questionnaires were highly incomplete. Because we had only 118 questionnaires, we decided to eliminate as few answers as possible and only in the cases where they were completely given randomly. 42.98% of the teachers who completed the questionnaire are males and 57.02% are females. The questionnaire contains 12 questions – five about adaptive and/or generative learning and seven for identification (university; faculty; specialization(s) where the respondent has classes; level and year of study where the respondent has classes; the teaching degree of the respondent; the age interval in which the respondent fits in; gender of the respondent). The first two questions about adaptive and/or generative learning are based on a Likert type scale, ranging from 0 - zero (meaning “never”) to 4 - four (meaning “always”). The first questions assesses how often teachers, when introducing new concepts or problems, encourage students to ask themselves questions related to the concept/problem, to examine the hypothesis and/or values that form the basis of that concept or problem. The second question evaluates how often teachers encourage students to build relationships between newly acquired information and information that was previously gained. The third and the fourth questions are related. Through these questions it is assessed whether the types of assessment used by teachers are more inclined towards promoting adaptive learning or, on the contrary, generative learning. The fifth question contains eight statements regarding strategies for generative learning, evaluated on a scale from 0 - zero (meaning “never” or “does not apply”) to 4 - four (meaning “always”). We have developed the fifth question, with its eight statements, starting from the details about generative learning strategies offered by Sharp et al. (2005).

4. Research results

The results suggest that, when presenting new concepts or problems, teachers frequently encourage students to ask themselves concept or problem-related questions, to examine the hypothesis and/or values that form the basis of the concept/problem, which shows that, in this particular case – of presenting new concepts/problems, teachers from economics and business administration faculties in higher education promote generative learning. The average is 3.48 out of

a maximum of 4.00 (4.00 meaning “always”). We are going to limit the comparisons of results to teaching degrees, age ranges and gender of the teachers because we are interested in adaptive and generative learning as concepts and not in these concepts within certain universities, faculties or specializations. Regarding the teaching degrees, the results range between a minimum of 3.41 (for lecturers) and a maximum of 3.75 (for PhD students). However, the differences are not relevant, the average scores being above 3.00 (3.00 meaning “frequently”). Between different age intervals, the average results vary between 3.00 (for teachers that are under 25 years old and for teachers who are 65 or older) and 3.59 (for teachers who are between 35-44 years old). In the case of gender, the differences are small – 3.37 in the case of male teachers and 3.55 in the case of female teachers.

The second question in the questionnaire refers to how often teachers encourage students to build relations between new information and previously acquired information. The average is 3.57, meaning that teachers often encourage this action, thus promoting generative learning from this point of view. Having the teaching degree as a control variable, the average ranges between a minimum of 3.44 (in the case of teaching assistants) and a maximum of 3.75 (in the case of PhD students), but the differences are very small, all averages being above 3.00. Considering age, the average results vary between a minimum of 3.48 (for the age interval of 45-54 years old) and 4.00 (for teachers under 25 years old). All the average results are good, being above 3.00 (which indicate that an action is frequently encouraged). In the case of the gender variable, the average results are 3.52 for female teachers and 3.61 for male teachers. Also, in this case, the differences are not relevant.

The third and fourth questions refer to students’ assessment, indicating the percentage of formal assessments (based on exams) – which is specific to adaptive learning – and, respectively the percentage of assessments based on case studies, discussions, debates, exercises proposed by students – which are specific to generative learning. The average results indicate that in 59.09% of the cases the evaluation is formal and in 40.91% of the cases the evaluation is based on case studies, discussions, debates, exercises proposed by students. Although the percentage is higher for formal evaluations, which would indicate a tendency to promote adaptive learning in terms of the assessment activities, we can consider that the 40.91% percentage for different types of assessments that promote generative learning is very good. We appreciate the percentage as very good because disciplines in the economic field tend to be technical; as a result, encouraging students to learn in a generative way may be a difficult task. A second reason would be the great number of students in economics and business administration fields in Romanian universities which makes evaluation a time and energy consuming task for teachers. In the case of teaching degree and age interval, the results indicate an interesting pattern. For the teaching degree, the best results are in the case of professors (56.17% for the first type of assessment and 43.83% for the second type) and the poorest results are for teaching assistants (69.06% and 30.94%, respectively). For age intervals, the best results are in the case of teachers that are 65 or older (50.00% and 50.00%, respectively) and the poorest results are in the case of teachers whose age is between 35-44 years (62.67% and 37.33%, respectively). Although evolution discontinuities between teachers’ degrees and age intervals occur, we can state that, as teachers advance in degree and gain more experience, they rely less and less on formal evaluations and more and more on evaluations based on debates, case studies, discussions,

thus increasingly promoting generative learning and encouraging students to learn in a generative way. A possible alternative explanation would be the fact that professors and associate professors teach, in general, more courses at the master level compared to lecturers and assistants. In general, more courses at the master level implies fewer learners, allowing better focus on generative learning strategies and, on the other hand, the learners have more experience, which enables them to more easily apply generative learning strategies. This is intended to be only a possible and general explanation, given the fact that, from the present study, we cannot infer the extent to which teachers have courses at the undergraduate / master / PhD level. Collecting data and analyzing the percentages regarding the courses held at the undergraduate / master / PhD level would have quite a low relevance, taking into consideration that this can vary from one semester to another and it is also related to contextual factors. The average results are similar between genders – for female teachers – 58.65% and 41.35%, respectively - and for male teachers – 59.22% and 40.78%, respectively.

The fifth question comprises eight statements that take into consideration different examples of generative learning strategies (for organization, integration and elaboration). This question evaluates how frequently teachers (in higher education economics and business administration faculties) encourage students to take different actions when learning. The average results for each statement are presented in the next table. The scale is from 0 - zero (meaning “never” or “does not apply”) to 4 - four (meaning “always”). The results are presented in Table 1.

Table 1. Generative learning strategies promoted by teachers – survey results

No.	Generative learning strategies - How often teachers encourage students to:	Results (average)
1.	Write summaries based on what students read and/or organize the content as chapters, subchapters, points etc.	1.86
2.	Synthesize the content in a graphical way (for example, mind maps).	1.63
3.	Integrate the subject with students' existing knowledge, by writing it in their own words.	2.18
4.	Use metaphors for integrating new knowledge with students' previously acquired knowledge.	2.17
5.	Identify real-world examples that are related to the content of a course.	3.37
6.	Predict the results and implications that a policy or procedure could have.	2.82
7.	Synthesize the content of a discipline with content from other disciplines.	2.18
8.	Infer the causes for certain outcomes.	3.02
Overall average		2.40

Source: Survey results, April 2013.

Out of the eight examples of generative learning strategies considered, only two have obtained an average above 3.00. An average equal to 3.00 would mean that teachers frequently encourage students to use those strategies. The strategies are: identifying real-world examples related to the content of a course (average of 3.37) and inferring causes for certain outcomes (3.02). Both are included in strategies for elaboration. The other two strategies for elaboration have obtained lower results: 2.82 and 2.18, respectively. The first two statements from the table centralizing the eight statements for generative learning strategies are for organization. Both obtain very low averages (1.86 and 1.63, respectively), which means that neither rarely nor frequently do

teachers encourage students to undertake one of those two actions. The third and fourth statements refer to integration. Although better than the results in the case of organization strategies, results are still low (2.18 and 2.17, respectively), indicating that teachers do not often encourage students to use these two strategies.

The overall average (which includes all the eight examples of strategies) is 2.40 out of a maximum of 4.00. An overall average of 3.00 would mean that teachers, in average, often encourage students to use different strategies for generative learning. But, considering the overall average obtained, of 2.40, we can conclude that teachers promote generative learning strategies, but not often. We are not going to analyze the results obtained for the eight statements in the case of the variables: teaching degree, age interval and gender of the respondents, but we mention that, in the majority of cases, the differences are rather insignificant. The results are detailed in Table 2.

Table 2. The results for question no. 5

Control variable	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8
<i>Teaching degree</i>								
PhD Student	2.25	2.25	2.25	1.75	3.50	3.25	1.75	3.50
Assistant	1.44	1.00	2.00	2.31	3.25	2.50	1.25	3.00
Lecturer	1.82	1.58	2.05	1.92	3.41	2.82	2.21	2.95
Associate Professor	2.08	1.73	2.58	2.52	3.62	3.04	2.15	2.96
Professor	1.90	1.84	2.10	2.16	3.16	2.74	2.71	3.10
<i>Age interval</i>								
Under 25	3.00	3.00	3.00	2.00	4.00	4.00	1.00	3.00
25-34 years old	1.60	1.36	2.13	1.98	3.37	2.87	1.96	3.18
35-44 years old	2.29	1.72	2.22	2.16	3.50	2.94	2.00	2.88
45-54 years old	1.90	1.81	2.38	2.33	3.24	2.62	2.52	2.95
55-64 years old	1.64	1.93	1.93	2.64	3.29	2.79	2.86	3.00
65 or older	1.50	1.50	2.00	1.50	3.00	1.50	2.50	2.50
<i>Gender</i>								
Female	2.08	1.52	2.42	2.17	3.43	2.91	2.12	3.03
Male	1.60	1.77	1.90	2.19	3.35	2.73	2.29	3.06
Overall average	1.86	1.63	2.18	2.17	3.37	2.82	2.18	3.02

Source: Survey results, April 2013.

5. Conclusions

We can conclude that teachers in the fields of economics and business administration, in higher education have a moderate inclination towards promoting generative learning. Teachers encourage students to use different strategies in order to learn in a generative way, but there are discrepancies between the intensity of promoting strategies for organization, integration and elaboration - elaboration being better promoted by teachers. Assessment leads in most cases to adaptive learning - 59.09%, on the average - while the average for assessments that lead to generative learning is 40.91%. This percentage may be satisfactory since we analyzed the fields of economics and business administration which are technical. Therefore implementing assessments based on case studies, discussions, debates may be a difficult task. Even more, the number of

students in the fields of economics and business administration is high, meaning that the evaluation of students is a time and energy consuming task for teachers. When new concepts or problems are presented, teachers usually encourage students to ask themselves questions, to examine the hypothesis and/or values that form the basis of a problem or concept (average of 3.48 out of a maximum of 4.00). Teachers frequently encourage students to build relations between new and previously acquired information (3.57).

As a limit of the study, we mention that we applied the questionnaire through an online survey so there may be problems of representativeness.

We conclude that improvement is necessary in the area of assessments and in promoting generative learning strategies, especially for organization and integration. When promoting adaptive learning, students learn and apply the knowledge they gain, but without being actively involved in the process. Also, they are not used to interpret or to criticize the information they receive. Thus, they do not usually improve their skills too much and are less prepared for a dynamic labor market. When promoting generative learning, students are actively involved in the learning process. They learn how to interpret and use the information in a way that generates added value. They are better prepared for the labour market. By better promoting generative learning, teachers could also help in the development of knowledge society and in creating a mentality that could facilitate a higher level in the case of a free society.

Note: A slightly different form of the content of this article was presented during the „2nd International Conference Free Economy, Free Society”(Iași, Romania, 21-22 May 2013).

References

- Argyris, C. and Schön, D. (1974) *Theory in practice: Increasing professional effectiveness*. San Francisco: Jossey Bass.
- Argyris, C. (1977) ‘Double Loop Learning in Organizations.’ *Harvard Business Review*, September – October, pp. 115-125.
- Chiva, R., Grandio, A. and Alegre, J. (2010) ‘Adaptive and Generative Learning: Implications from Complexity Theories.’ *International Journal of Management Reviews*, Vol. 12, No. 2, pp. 114-129.
- Cohen, A.I. (1999) ‘Friendship and the free society.’ *Freeman*, Vol. 49, No. 8, pp. 20-22.
- Delanty, G. (2002) ‘The governance of universities: what is the role of the university in the knowledge society?’ *Canadian Journal of Sociology*, Vol. 27, No. 2, pp. 185-198.
- Driver, M. (2001) ‘Activity-based costing: A tool for adaptive and generative organizational learning?’ *The Learning Organization*, Vol. 8, No. 3, pp. 94-105.
- Freeman, I. and Knight, P. (2011) ‘Double-Loop Learning and the Global Business Student.’ *The Canadian Journal of Higher Education*, Vol. 41, No. 3, pp. 102-127.
- Grabowski, B.L. (1996) ‘Generative learning: Past, present, and future.’ In Jonassen, D.H. (Ed.), *Handbook of research for educational communications and technology*. New York: Simon & Schuster Macmillan, pp. 897-918.

- Jonassen, D.H. (1988) 'Integrating learning strategies into courseware to facilitate deeper processing.' In Jonassen, D.H. (Ed.) *Instructional Designs for Microcomputer Courseware*. Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 151-181.
- Korth, S.J. (2000) 'Single and double-loop learning: Exploring potential influence of cognitive style.' *Organization Development Journal*, Vol. 18, No. 3, pp. 87-98.
- Lee, H.W., Lim, K.Y. and Grabowski, B. (2009) 'Generative Learning Strategies and Metacognitive Feedback to Facilitate Comprehension of Complex Science Topics and Self-Regulation.' *Journal of Educational Multimedia and Hypermedia*, Vol. 18, No. 1, pp. 5-25.
- Lee, H.W., Lim, K.Y. and Grabowski, B.L. (2008) 'Generative Learning: Principles and Implications for Making Meaning.' In Spector, J.M., Merrill, M.D., van Merriënboer, J.J.G. and Driscoll, M.P. (Eds.) *Handbook of Research on Educational Communications and Technology*. Third Edition, New York/Abingdon: Lawrence Erlbaum Associates, pp. 111-124.
- Pârgaru, I., Gherghina, R. and Duca, I. (2009) 'The Role of Education in the Knowledge-Based Society During the Economic Crisis.' *Annales Universitatis Apulensis: Series Oeconomica*, Vol. 11, No. 2, pp. 646-651.
- Sharp, D.C., Knowlton, D.S. and Weiss, R.E. (2005) 'Applications of Generative Learning for the Survey of International Economics Course.' *Journal of Economic Education*, Vol. 36, No. 4, pp. 345 – 357.
- Sharp, D.C. (2003) 'Problem-based learning in an MBA economics course: Confessions of a first-time PBL user.' In Knowlton, D.S. and Sharp, D.C. (Eds.) *Problem-Based Learning in the Information Age*. San Francisco: Jossey-Bass, pp. 45-51.
- Wittrock, M.C. (1974) 'Learning as a generative process.' *Educational Psychologist*, Vol. 11, No. 2, pp. 87-95.
- Wittrock, M.C. (1989) 'Generative Processes of Comprehension.' *Educational Psychologist*, Vol. 24, No. 4, pp. 345-376.
- Wittrock, M.C. (1992) 'Generative Learning Processes of the Brain.' *Educational Psychologist*, Vol. 27, No. 4, pp. 531-541.