UDC 378.147

ACTIVE LEARNING TECHNIQUES IN HIGHER EDUCATION

Fedoryshyn O.P.
Rivne State University of the Humanities

In the article the latest explorings of different approaches to activation of teaching and learning process in higher education are analysed. A majority of classes in institutions of higher education are taught in the traditional lecture mode. Many explorers point out that traditional lecturing does not involve significant audience participation but relies upon passive listening. Therefore they suggest different active learning techniques to actively engage students in more activities than just listening passively which can help to increase effectiveness in teaching and learning.
Keywords: active learning, student-centered approach, transactions between teachers and students, student involvement, effectiveness, assessment, teaching and learning process.

In the era of the 21st century knowledge society, higher education can play an important role as a driver for innovation, leadership and creativity, as it helps develop not only well informed and knowledgeable citizens but also responsible and creative individuals. The challenges of globalization, tightly linked with rapid developments in Information and Communication Technologies (ICT) and the need to address issues of quality and inclusiveness for a better quality of life and a sustainable future, have become drivers of change in higher education institutions.

Universities are no longer the only producers of knowledge and information; rather, we exist in an environment of increasing competition by alternative information providers. Higher education institutions are progressively being asked to justify their traditional place in society with increasing scrutiny raising questions about both research undertaken and the quality of graduates produced. The connection between education and citizenship is greatly emphasized now. The social mission of higher education is to integrate a cross section of proficiencies and attributes that are essential for preparing our students for both contemporary challenges as well as a world dominated by uncertainty and disruption. Since the 1980s an extensive research literature has investigated how to improve student success in higher education focusing on student outcomes such as retention, completion and employability. A parallel research programme has focused on how students engage with their studies and what they, institutions and educators, can do to enhance their engagement, and hence success. It identifies four perspectives to develop a conceptual organizer for student engagement: student motivation; transactions between teachers and students; institutional support; and engagement for active citizenship. The majority of all colleges still teach their classes in the traditional lecture mode. A lecture (from the French «lecture», meaning «reading» [process]) is an oral presentation intended to present information or teach people about a particular subject, for example by a university or college teacher. Lectures are used to convey critical information, history, background, theories, and equations. Though lectures are much criticised as a teaching method, universities have not yet found practical alternative teaching methods for the large majority of their courses [11]. Critics point out that lecturing is mainly a one-way method of communication that does not involve significant audience participation but relies upon passive learning. Therefore, lecturing is often contrasted to active learning. Lectures delivered by talented speakers can be highly stimulating; at the very least, lectures have survived in academia as a quick, cheap, and efficient way of introducing large numbers of students to a particular field of study.

The effectiveness of traditional lecture is and has been debated. Some advantages of lecturing include: quick exposure to new material, greater teacher control in the classroom, an engaging format, which may complement and clarify course material, and facilitating large-class communication [11]. Lecturing also permits the dissemination of unpublished or not readily available material [1].

There has been much debate as to whether or not lecturing actually improves student learning in the classroom. Commonly cited disadvantages of lecture include: placing students in a passive (rather than an active) role, encouraging one-way communication, requiring significant out-of-class time for students to engage with the material, and requiring the speaker to possess effective speaking skills [11].

While lecturing is generally accepted as an effective form of instruction, there have been some prominent educators who have succeeded without the help of lectures, using other forms of academic teaching which include discussion, seminars, workshops, observation, practical application, case examples/case study, experiential learning/active learning, computer-based instruction, and tutorials. We are experiencing a shift towards more integrated and student-centered approach to teaching.

«Active Learning» is, in short, anything that students do in a classroom other than merely passively listening to an instructor's lecture. This includes everything from listening practices which help the students to absorb what they hear, to short writing exercises in which students react to lecture material, to complex group exercises in which students apply course material to «real life» situations and/or to new problems.

The most commonly cited definition of active learning comes from Bonwell and Eison (1991): «Involving students in doing things and thinking about what they are doing» [4, p. 121]. They describe active learning as student engagement in more activities than just listening. Students are in-

volved in dialogue, debate, writing, and problem solving, as well as higher-order thinking, e.g., analysis, synthesis, evaluation. The words «involved» and «problem solving» are worthy emphasis; active learning is not busy work, but is purposeful instruction that guides students towards learning outcomes [4].

Using the Bonwell and Eison definition, Braxton et al. examined the impact of active learning classroom approaches, specifically «class discussions, knowledge-level examination questions, group work, and higher-order thinking activities,» on student persistence and their feelings of social integration [4, p. 571]. Their results suggest that active learning may influence students' social integration.

In recent years, numerous educators have studied and measured the effectiveness of the traditional lecture method. Results consistently show that students retain far fewer course concepts when sitting passively listening than when they are actively engaged in the learning process. Like Bonwell and Eison, Zull emphasizes «doing», but he uses the term «action», stating that its value lies in «what the learner perceives about his or her own actions. Action is a test of learning...» [17, p. 30]. These findings are consistent with Harvard's Professor Eric Mazur, a pioneer of active learning who developed a method called Peer Instruction. Mazur has conducted his own research since implementing his method in the mid 1990's, proving that active learning is more effective not only in retention of knowledge, but for developing critical thinking skills [12].

Grabinger and Dunlap introduced active learning as comprehensive instructional system that encourages students to develop initiative content [7]. The other explorer, Leamnson, defines learning as «stabilizing, through repeated use, certain appropriate and desirable synapses in the brain» [10; 5]. Active learning is a crucial element of the new thrust toward what is now commonly called «learner-centered» or «learning-centered» teaching [16].

Prince points out that: In practice, active learning refers to activities that are introduced into the classroom. The core elements of active learning are student activity and engagement in the learning process. Active learning is often contrasted to the traditional lecture where students passively receive information from the instructor [14]. Berry further postulates that four key elements characterize all active learning approaches: (1) critical thinking, (2) individual responsibility for learning, (3) involvement in open-ended activities, and (4) organization of learning activities by the professor [3; 5].

Presenting the main material. In the article the techniques of active learning described in details by Donald Paulson and Jennifer Faust are considered. «Techniques of active learning» are those activities which an instructor incorporates into the classroom to foster active learning [13].

Among a great variety of them, they highlight such techniques as: exercises for individual students; questions and answers; immediate feedback; critical thinking motivators; share/pair; cooperative learning exercises.

Exercises for individual students are aimed at individual students, they can very easily be used without interrupting the flow of the class. These exercises are particularly useful in providing the teacher with feedback concerning student understanding and retention of material.

· The *«One Minute Paper»* is a highly effective technique for checking student progress, both in understanding the material and in reacting to course material. The instructor asks students to take out a blank sheet of paper, poses a question and gives them one (or perhaps two – but not many more) minute(s) to respond. It will help him to know whether or not the students are viewing the material.

· *Muddiest (or Clearest) Point* is a variation on the one-minute paper. Students can be given a slightly longer time period to answer the question. At the end of a class period they are asked «What was the 'muddiest point' in today's lecture?» or «What anything do you find unclear?».

· *Affective Response* is similar to the above exercises, but here students are being asked to report their reactions to some facet of the course material – i.e. to provide an emotional or evaluative response to the material. By having several views before theory is presented the instructor can help students to see the material in context and to explore their own beliefs.

· *Daily journal* combines the advantages of the three techniques and allows for more in-depth discussion of or reaction to course material. The instructor may set aside class time for students to complete their journal entries, or assign this as homework. The only disadvantage to this approach is that the feedback will not be as «instant» as with the one-minute paper. But with this approach more complex questions may be asked. Students can find and discuss reports of scientific studies in popular media on topics relevant to course material.

· *Reading quiz* is one way to coerce students to read assigned material. Active learning depends upon students coming to class prepared. The reading quiz can also be used as an effective measure of student comprehension of the readings. Carefully chosen questions will both identify who has read the material and identify what is important in the reading.

· *Clarification Pauses* is a simple technique aimed at fostering «active listening». Throughout a lecture, particularly after stating an important point or defining a key concept, the instructor asks if anyone needs to have it clarified. He can also circulate around the room during these pauses to look at student notes, answer questions, etc.

· *Response to a demonstration or other teacher centered activity* – the students are asked to write a paragraph that begins with: «I was surprised ... / learned that... / wonder about... This allows the students to reflect on what they actually got out of the teachers' presentation. It also helps students realize that the activity was designed for more than just entertainment.

Questions and answers. Instructors use questions as a way of prodding students and instantly testing comprehension, but there are simple ways of tweaking questioning techniques which increase student involvement and comprehension. This technique in its original format involves instructors

«testing» student knowledge (of reading assignments, lectures, or perhaps applications of course material to a wider context) by asking questions during the course of a lecture. Typically, the instructor chooses a particular student, presents one with a question, and expects an answer forthwith; of the chosen student cannot answer the question presented, the instructor chooses another (and another) until the desired answer is received.

· *Wait time* – rather than choosing the student who will answer the question presented, this variation has the instructor *waiting* before calling on someone to answer it. The wait time will generally be short (15 seconds or so) – but t may seem interminable in the classroom. It is important to insist that no one raise his hand (or shout out the answer) before the instructor gives the OK. Waiting forces every student to think about the question, rather than passively relying on those students who are fastest to answer every question. When the wait time is up, the instructor asks for volunteers or randomly picks a student to answer the question. Once students are in the habit of waiting after questions are asked, more will get involved in the process.

· *Student Summary of Another Student's Answer* – in order to promote active listening, after one student has volunteered an answer to instructor's question, the instructor asks another student to summarize the first student's response. Many students hear little of what their classmates have to say, waiting instead for the instructor to either correct or repeat the answer. Having students summarize or repeat each others contributions to the course both fosters active participation by all students and promotes the idea that learning is a shared enterprise. Given the possibility of being asked to repeat a classmate's comments, most students will listen more attentively to each other.

· *The Fish Bowl* – student's are given index cards and asked to write down one question concerning the course material. They should be directed to ask a question of clarification regarding some aspect of the material which they do not fully understand. At the end of the class period (or at the beginning of the next class meeting if the question is assigned for homework), students deposit their questions in a fish bowl. The instructor then draws several questions out of the bowl and answers them for the class or asks the class to answer them.

· *Quiz / Test Questions* – here students are asked to become actively involved in the creation of quizzes and tests by constructing some (or all) of the questions for the exams. This exercise may be assigned for homework and itself evaluated (perhaps for extra credit points). In asking students to thing u kip exam questions, instructors encourage them to think more deeply about the course material and to explore major themes, comparison of views presented, applications, and other higher-order thinking skills. Once suggested questions are collected, the instructor may use them as the basis of review sessions and to model the most effective questions. Students might be asked to discuss several aspects of two different questions on the same material including degree of difficulty, effectiveness in assessing their learning, proper scope of questions and so forth. This technique will significantly increase students' engagement of the material to supply answers.

Immediate Feedback – is designed to give the instructor some indication of student understanding of the material presented during the lecture. These activities provide formative assessment rather than summative assessment of student understanding. Formative assessment is evaluation of the class as a whole in order to provide information for the benefit of the students and the instructor but the information is not used as part of the course grade; summative assessment is any evaluation of student performance which becomes part of the course grade. For each feedback method the instructor stops at appropriate points to give quick tests of the material; in this way the instructor can adjust the lecture mid-course, slowing down to spend more time on the concepts students are having difficulty with or moving more quickly to applications of concepts of which students have a good understanding.

· *Finger Signals* is a method which provides instructors with a means of testing student comprehension without the waiting period or the grading time required for written quizzes. Students are asked questions and instructed to signal their answers by holding up the appropriate number of fingers immediate in front of their torsos (this makes it impossible for students to «copy» thus committing them to answer each question on their own). For example, the instructor might say «one finger for 'yes', two for 'no'», and then asks questions. In very large classes students can use a set of large cardboard signs with numbers written on them. This method allows instructors to assess student knowledge literally at a glance.

· *Flash Cards* is a variation of the Finger Signals approach. This method tests students comprehension through their response to flash cards held by the instructors.

· *Quotations* is a particularly useful method of testing student understanding when they are learning to read texts and identify an author's viewpoint and arguments. After students have read a representative advocate of each of several opposing theories or schools of thought, and the relevant concepts have been defined and discussed in class, put on the over head projector a quotation by an author whom they have not read in the assigned materials and ask them to figure out what position that person advocates. In addition to testing comprehension of the material presented in lecture, thus exercise develops critical thinking and analysis skills. This would be very useful, for example, in discussing the various aspects of evolutionary theory.

Critical Thinking Motivators. Sometimes it is helpful to get students involved in discussion of or thinking about course material either before any theory is presented in lecture or after several conflicting theories have been presented. The idea in the first case is to generate data or questions prior to *mapping out* the theoretical landscape; in the second case the students learn to assess the relative merits of several approaches.

· *The Pre-Theoretic Intuitions Quiz* – students often dutifully record everything the instructor

says during a lecture and then ask at the end of the course «What is the use of this?» To avoid such question and to get students interested in a topic before lectures begin an instructor can give a quiz aimed at getting students to both identify and to assess their own views. An example of this is «True or False» questionnaire designed to start students thinking about theory. After students gave responded to the questions individually, they compare answers in pairs or small groups and discuss the ones on which they disagree. This technique may also be used to assess student knowledge of the subject matter in a pre-/post-lecture comparison.

· *Puzzle / Paradoxes* – is one of the most useful means of ferreting out students' intuitions on a given topic and present them with paradox or a puzzle involving the concepts at issue, and to have them struggle towards a solution. Students will be able to critically assess theories when they are presented later. Introductory logic students might be present with complex logic puzzles as a way of motivating truth tables, and so forth.

Share / Pair. Grouping students in pairs allows many of the advantages of group work. Students have the opportunity to state their own views,, to hear from others, to hone their argumentative skills without the administrative «costs» of group work (time spent assigning people to groups, class time used just for «getting in groups» and so on). Further, pairs make it virtually impossible for students to avoid participating thus making each person accountable.

· *Discussion* – students are asked to pair off and to respond to a question either in turn or as a pair. This can easily be combined with other techniques such as those under «questions and answers» or «Critical Thinking Motivators». Students can be asked to compare answers to a limited number of questions and to discuss the statements on which they differed. Generally, this works best when students are given explicit directions, such as «Tell each other why you chose the answer you did».

· *Note Comparison / Sharing* – one reason that some students perform poorly in classes is that they often do not have good note-taking skills. That is, while they might listen attentively, students do not always know what to write down, or they may have gaps in their notes which will leave them bewildered when they go back to the notes to study or to write a paper. One way to avoid some of these pitfalls and to have students model good note-taking is to have them occasionally compare notes. The instructor might stop lecturing immediately after covering a crucial concept and have students read each others' notes, filling in the gaps in their own note-taking. This is especially useful in introductory courses or in courses designed for non-majors or special admissions students. Once students see the value of supplementing their own note-taking with others', they are likely to continue the practice outside of class time.

· *Evaluation of Another Student's Work* – students are asked to complete an individual homework assignment or short paper. On the day the assignment is due, students submit one copy to the instructor to be graded and one copy to their partner. These may be assigned that day, or students may be assigned partners to work with throughout the term. Each student then takes their partner's work and depending on the nature of the assignment gives critical feedback, standardizes or assesses the arguments, corrects mistakes in problem-solving or grammar, and so forth. This is a particularly effective way to improve student writing.

Cooperative Learning Exercises. «Cooperative learning» suggests, students working in groups will help each other to learn. Generally, it is better to form heterogeneous groups (with regard to gender, ethnicity, and academic performance), particularly when the groups will be working together over time or on complex projects; however, some of these techniques work well with spontaneously formed groups. Cooperative groups encourage discussion of problem solving techniques, and avoid the embarrassment of students who have not yet mastered all of the skills required.

· *Cooperative Groups in Class* – the instructor poses a question to be worked on in each cooperative group and then circulates around the room answering questions, asking further questions, keeping the groups on task, and so forth. After an appropriate time for group discussion, students are asked to share their discussion points with the rest of the class.

· *Active Review Sessions* – in the traditional class review session the students ask questions and the instructor answers them. Students spend their time copying down answers rather than thinking about the material. In an active review session the instructor posses *questions* and the students work on them in groups. Then students are asked to show their solutions to the whole group and discuss any differences among solutions proposed.

· *Work at the Blackboard* – In many problem solving courses (e.g., logic or critical thinking), instructors tend to review homework or teach problem solving techniques by *solving* the problems themselves. Because students learn more by doing, rather than watching, this is probably not the optimal scenario. Rather than illustrating problem solving, students should work out the problems themselves, being asked to go to the blackboard in small groups to solve problems. If there is insufficient blackboard space, students can still work out problems as a group, using paper and pencil or computers if appropriate software is available.

· *Concept Mapping* – A concept map is a way of illustrating the connections that exist between terms or concepts covered in course material; students construct concept maps by connecting individual terms by lines which indicate the relationship between each set of connected terms. Most of the terms in a concept map have multiple connections. Developing a concept map requires the students to identify and organize information and to establish meaningful relationships between the pieces of information.

· *Visual Lists* – Here students are asked to make a list-on paper or on the blackboard; by working in groups, students typically can generate more comprehensive lists than they might if working alone. This method is particularly effec-

tive when students are asked to compare views or to list pros and cons of a position. One technique which works well with such comparisons is to have students draw a «T» and to label the left- and right-hand sides of the cross bar with the opposing positions (or «Pro» and «Con»). They then list everything they can think of which supports these positions on the relevant side of the vertical line. Once they have generated as thorough a list as they can, ask them to analyze the lists with questions appropriate to the exercise. Often having the list before them helps to determine the ultimate utility of the action, and the requirement to fill in the «T» generally results in a more thorough accounting of the consequences of the action in question.

· *Jigsaw Group Projects* – in jigsaw projects, each member of a group is asked to complete some discrete part of an assignment; when every member has completed his assigned task, the pieces can be joined together to form a finished project. When each student has completed his research, the group then reforms to complete a comprehensive report. Then the groups are reformed so that each group has an expert in one form. They then tackle the difficult problem for discussion.

· *Role Playing* – Here students are asked to «act out» a part. In doing so, they get a better idea of the concepts and theories being discussed. Complex role playing might take the form of a play (depending on time and resources).

· *Panel Discussions* are especially useful when students are asked to give class presentations or reports as a way of including the entire class in the presentation. Student groups are assigned a topic to research and asked to prepare presentations (note that this may readily be combined with the jigsaw method outlined above). Each panelist is then expected to make a very short presentation, before the floor is opened to questions from «the audience». The key to success is to choose topics carefully and to give students sufficient direction to ensure that they are well-prepared for their presentations.

· *Debates* provide an efficient structure for class presentations when the subject matter easily divides into opposing views or «Pro» / «Con» considerations. Students are assigned to debate teams, given a position to defend, and then asked to present arguments in support of their position on the presentation day. The opposing team should be given an opportunity to rebut the argument(s) and, time permitting, the original presenters asked to respond to the rebuttal. This format is particularly useful in developing argumentation skills (in addition to teaching content).

· *Games* – there are some concepts or theories which are more easily illustrated than discussed and in these cases, a well-conceived game may convey the idea more readily. Students are asked to «discover» the problem, by formulating and testing hypotheses as the game proceeds.

Conclusions and prospects of further researches. Active learning is a very popular topic in educational literature as it is a means to improve teaching and learning in the classroom. Teaching cannot be reduced to formulaic methods and active learning is not the cure for all educational problems. However there is broad support for the elements of active learning process. In higher education it is still fairly nascent, and the debate over its effectiveness will likely require more well-controlled randomized studies. This will certainly take many years as practical alternative teaching methods for the large majority of theoretical courses have not been found.

Active learning provides skills for real life problem solving and prepares students to become responsible and active citizens. If students feel comfortable actively participating, then the classroom climate – the classes' academic, social, emotional, and physical environment – must also be taken into consideration.

To conclude, active learning would start with an instructor who is active learner and active instructor himself and can upgrade his knowledge and skills in the time of need. He has to identify the needs with what he thinks is the best for the learning environment.

References:

1. Advantages & Disadvantages of Lecturing // TeachingResourcesGuide.com., South Alabama University, URL: http://www.southalabama.edu/languages/spanish/TRG/TRG/Enhancing_Learning/Lecturing/advantages.htm (Retrieved: 04 March 2015).
2. Austin A.W. Student Involvement: A Developmental Theory for Higher Education // Journal of College Student Personnel, № 25, 1984 – Pp. 297-308.
3. Berry W. Surviving Lecture: A Pedagogical Alternative // College Teaching, № 56(3), 2008. – Pp. 149-154.
4. Bonwell C. Active Learning: Creating Excitement in the Classroom / Bonwell C., Eison J. // ASHE-Eric Higher Education Report, № 1, 1991. – Washington, D.C.: George Washington University Clearinghouse on Higher Education. – P. 121.
5. Braxton J.M. The influence of active learning on the college student departure process / Braxton J.M., Milen J.F. and Sullivan A.S. // Toward a revision of Tinto's theory // The journal of Higher Education, № 71(5), 2000 – Pp. 590-669.
6. Frederik P. Student Involvement: Active Learning in Large Classes / M. Weiner, ed. Teaching Large Classes Well, 1987. – Pp. 45-56.
7. Gralinger R.S. Rich environments for active learning: a definition / Garinger R.S., Dunlap J.C. // Association for Learning Technology Journal (ACT-j), № 3(2), 1995. – Pp. 5-34.
8. Heaslip G. Active Learning in Higher Education / Heaslip G., Donovan G., Cullen J. // Student response systems and learner engagement in large classes, Vol. 15(1), 2014. – Pp. 11-24.
9. Jeno L.M. Encouraging Active Learning in Higher Education: A Self-Determination Theory Perspective // International Journal of Technology and Inclusive Education, № 5(1), 2015. – Pp. 716-721.
10. Leamson R. Thinking about teaching and learning: Developing habits of learning with the first year college and university students, Sterling. VA: Stylus.

11. Lecturing: Advantages and Disadvantages of the Traditional Lecture Method // CIRTL Network. – http://en.wikipedia.org/wiki/Lecture.
12. Mazur E. Peer Instruction: A user's manual. – Prentice Hall, H.J., 1997. – 253 p.
13. Paulson D.R. Active Learning for the College Classroom / Paulson D.R., Faust J.L. // URL: http://www.calstatela.edu/dept/chem/chem2/Active/main.htm.
14. Prince M.J. Does Active Learning Work? / A view of the research // Journal of Engineering Education, № 93(3), 2004. – Pp. 223-231. URL: http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Prince_AL.pdf.
15. Sander P. University Students: Expectation of Teaching / Sander P., Stevenson K., King M. and Coates D. // Studies in Higher Education, № 25, 2000. – Pp. 309-323.
16. Weimer M.E. Learner-Centered Teaching: Five Key Changes to Practice. – San Francisco: Jossey-Bass, 2002. – 245 p.
17. Zull J.E. From Brain to Mind: Using Neuroscience to Guide Change in Education. – Sterling, VA: Stylus Publishing, 2011.

Федоришин О.П.
Рівненський державний гуманітарний університет

ПРИЙОМИ АКТИВНОГО НАВЧАННЯ У ВИЩІЙ ШКОЛІ

Анотація
У статті аналізуються проведені за останній час дослідження різних підходів до активізації навчального процесу у вищій школі та обґрунтовується необхідність їх використання. Науковці вказують, що традиційна лекція за своєю формою не залучає студентів до безпосередньої участі у процесі, а швидше спрямована на пасивне сприйняття матеріалу. Вони діляться своїм баченням проблеми та пропонують різні прийоми активного навчання з метою перетворити пасивне слухання лекції в активне, що значно підвищує ефективність навчання, поглиблює знання студентів та сприяє самостійному мисленню.
Ключові слова: активне навчання, взаємодія між викладачами і студентами, ефективність, оцінювання, процес викладання і навчання.

Федоришин А.П.
Ровенский государственный гуманитарный университет

ПРИЁМЫ АКТИВНОГО ОБУЧЕНИЯ В ВЫСШЕЙ ШКОЛЕ

Аннотация
В статье анализируются проведённые за последнее время исследования разных подходов к активизации учебного процесса в высшей школе и обосновывают необходимость их применения. Учёные обращают внимание на то, что традиционная форма проведения лекции не привлекает студентов к непосредственному участию в процессе, а представляет собой процесс пассивного восприятия материала. Они предлагают использовать разные приёмы активного обучения с целью превратить пассивное слушание лекции в активную деятельность, что позволит значительно повысить эффективность обучения, углубить знания студентов и будет способствовать развитию самостоятельного мышления.
Ключевые слова: активное обучение, взаимодействие между преподавателем и студентами, эффективность, оценивание, процесс преподавания.