THE PROBLEM OF INTEGRATING TECHNOLOGY INTO TEACHING AND LEARNING PROCESS

Ismailova Zukhra Karabaevna
Doctor of Pedagogical Sciences, Professor of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
Mukumova Dilrabo Inatovna
PhD of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
&
Mustafoeva Durdona Asilovna
Doctoral Student of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

ABSTRACT

The problem of integrating technology into teaching and learning process has become a perennial one. Common excuses for the limited use of technology to support instruction include shortage of computers, lack of computer skill and computer intimidation. While these could affect the success of technology integration, it should be acknowledged that the degree of success teachers have in using technology for instruction could depend in part on their ability to explore the relationship between pedagogy and technology. The article shows that technology integration is narrowly perceived and that such a perception might hinder teachers' understanding of the scope of technology in education. Technology integration should be considered along with issues involved in teaching and learning. Such issues include developing learning objectives, selecting methods of instruction, feedback, and evaluation and assessment strategies including follow-up activities. Technology used for teaching and learning should be considered an integral part of instruction and not as an object exclusive to itself. Viewing technology integration from a wide perspective will provide teachers with the necessary foundation to implement technology into the classroom more successfully.

Keywords: Integration, technology, education, training, pedagogy, pedagogical process, training, teaching, methods, problem, software, computer science, pedagogical skills.

INTRODUCTION

In the National Program for Personnel Training (1992), when it comes to the problems of the education system, there is a lack of material and technical base and quality manuals, scientific literature and modern technologies. In our opinion, it is desirable for us to introduce and introduce the innovations and achievements in the educational system of the developed countries of the world, to reform the educational system of all educational institutions and universities, to develop and apply them on the basis of modern technologies. This issue will undoubtedly play a promising role in forming one of the strategic goals. In order to fulfill this task, it is necessary to consistently continue the process of computerization of the education sector, which began in the early years of independence in our country, because the continuous scientific and technical development, including new generations of computers and a consistently improved methodological software, are required. As you know, the computerization of the education sector consists of two components, the first one is material, second, intellectual. The tangible component consists of computers directly equipped with electronic learning monitors, electronic projectors, and training classes at the level required to be used locally. However, no matter how modern or high the cost of this tangible component, it does not work or will be ineffective with a good, affordable and specialized software.

Therefore, secondly, there is a high demand for the intellectual component, and they are naturally expanding and harmonious with the content. Subjects of this process can also be divided into two categories: students or teachers (2003) Educational Resources That Meet Time-Requirements: An original material base (classrooms, laboratories, libraries, etc.), computer classes, highly-qualified teachers are involved in the learning process to build knowledge, skills and creative abilities.

This article discusses the narrow perception of the term "technology integration" and considers that such a perception is likely to result in a poor use of technology for instructional purposes. The scope of technology integration is examined with a view of showing its relationship with pedagogy. It should be noted that technology, which is used to facilitate learning, is part of the instructional process and not an appendage to be attached at any convenient stage during the course of instruction. Technology integration not only involves the inclusion of technical artifacts per se, but also includes theories about technology integration and the application of research findings to promote teaching/learning. It is not restricted to the mechanical application of various new computer hardware and software devices during the process of instruction. It should include the strategies for selecting the desired technologies, skill to demonstrate how the selected technologies will be used, skill to evaluate such technologies, as well as the skill to customize the use of such technological skills in a way that addresses instructional problems. The decision on the selection and use of technology for instruction should be made at the onset – when the instruction is being prepared, not in the middle or at the conclusion of the instruction. The objective and method of instruction including technology and outcomes of instruction should be specified at the planning stage. This point is illustrated by Diaz & Bontembal (2000):

- Using technology to enhance the educational process involves more than just learning how to use specific piece of hardware and software. It requires an understanding of pedagogical principles that are specific to the use of technology in an instructional settings…Pedagogy-based training begins by helping teachers understand the role of learning theory in the design and function of class activities and in the selection and use of instructional technologies. (pp. 2 and 6)

The relationship between instructional technology and pedagogical concepts is considered with a view of assisting teachers to recognize the impact of such a relationship in an educational inquiry. Technology integration is complex and is made up of processes of interconnected activities. The essence of this article is to explore those processes and to encourage teachers and those connected with technology integration to be reflective practitioners.

The Scope of Instructional Technology

Technology in education is commonly defined as a technical device or tool used to enhance instruction. According to Lever-Duffy, McDonald, and Mizell (2005) "educational technology might include media, models, projected and non-projected visual, as well as audio, video and digital media." These authors claim that some "educators may take a narrower view" and are likely to "confine educational technology The Journal of Technology Studies 67 primarily to computers, computer peripherals and related software used for teaching and learning" (pp. 4, 5). This definition does not take into consideration the pedagogical principles upon which the application of various technologies into educational inquiry are based. Such a definition is narrow because it isolates technology from pedagogical processes that it is intended to support. It does not connect instructional technology with the learning objectives, methods of instruction, learning style and pace of learning, assessment and evaluation strategies, including follow-up procedures . Specifically, technology integration should incorporate the technological skill and ability to use pedagogical knowledge as a base for integrating technology into teaching and

learning. This implies that teachers should develop strategies to motivate students to keep them focused as the instruction progresses and to consider that different students prefer different learning styles and that they learn at different rates.

It is important that teachers use a variety of teaching methods, and students must be taught to use the newly acquired knowledge and skill as well as to critically evaluate and modify such knowledge. In other words, teachers should be able to engage students in an exploratory learning experience which is designed to stimulate thinking. According to Bruner (1966), the essence of teaching and learning is to help learners acquire knowledge and use the knowledge they have acquired to create other knowledge. Bruner eloquently states:

To instruct someone ... is not a matter of getting him to commit results to mind. Rather, it is to teach him to participate in the process that makes possible the establishment of knowledge. We teach a subject not to produce little living libraries on that subject, but rather to get a student to think mathematically for himself, to consider matters as an historian does, to tak e part in the process of knowledge-getting. Knowing is a process not a product. (p. 72)

This can imply that teaching software skills without consideration to the basic foundation knowledge that justifies their application is likely to result in rote memorization of disjointed information on various technologies used. Ausubel (1978) claims that this type of teaching method is likely to lead to forgetfulness.

In a broad sense, technology integration can be described as a process of using existing tools, equipment and materials, including the use of electronic media, for the purpose of enhancing learning. It involves managing and coordinating available instructional aids and resources in order to facilitate learning. It also involves the selection of suitable technology based on the learning needs of students as well as the ability of teachers to adapt such technology to fit specific learning activities. It calls for teachers' ability to select suitable technology while planning instruction. It also requires teachers to use appropriate technology to present and evaluate instruction as well as use relevant technology for follow-up learning activities. Such a broad definition of technology in education will help teachers develop a rational approach toward technology integration.

Problems of Technology Integration

Human technology, which is a component of the Technical Knowledge Objective, relates to labor, technological processes, materials, and human experience. The diagnostics of vocational training teachers are defined as the technical component of integration in the process of teaching and the content of the engineering component, which is the subject of diagnostics and training, of the teacher. Thus, the integration of pedagogical and technical knowledge is largely achieved through special methods of teaching various technical subjects. The relationship between methodology and non-pedagogical sciences to different components is not the same. The most current issues are the content of teaching in this subject.

One of the peculiarities of this activity is the integration of pedagogical and technical knowledge, taking into account the essence and content of the teacher's professional activity.

The study of Leh (2005) reveals that teachers admitted "they did not resist technology per se but agreed that they could not fully integrate it into their own practices because of the organizational, administrative, pedagogical, or personal constraints" (p. 19). Leh claims that the teachers acknowledge, "technology was more of a problem with multiple facets rather than

a solu - tion …" (p. 19). Defining instructional technology in broad spectrum helps educators, especially inexperienced teachers, understand the pedagogical issues to be considered when using technology to enhance the process of teaching and learning . Leh also calls for the "the national organizations involved in teacher standards to recognize that teachers need to … develop a foundation upon which to build their understanding of technology integration (p. 46). Technology should not be treated as a separate entity but should be considered as an integral part of instructional delivery.

The teacher should be able to assess the appropriateness of any technology used for teaching and learning in relation to specific instruction. The teacher should also consider how the technology selected fits into the objective of the lesson, methods of instruction, e valuation, The Journal of Technology Studies 68 feedback and follow-up initiatives. Such consideration will provide teachers the opportunity to reflect on their practice and reduce the tendency to integrate technology into teaching and learning in a mechanistic way. Fletcher (1996) has provided an interesting scenario to show that technology integration should be grounded in sound educational practices:

In teaching and learning, technology should be applied as a process rather than as a single, isolated and discrete activity. The American Heritage Dictionary defines process as "a series of actions, changes, functions bringing about a result." Technology in education is not a mere object to be introduced into teaching and learning activities at will without considering basic principles of learning and sound teaching methodology. Therefore, to assume that educational technology is an object that can be used and detached at any time is a false assumption because educational technology is not applied in a vacuum. It is guided by learning principles about ho w individuals lear n and ho w the y retain the knowledge and skill they have acquired. It is also based on the students' expectations of the outcome of learning and how the outcomes could be applied to enrich practical life experiences. Therefore, technological application should be based on sound teaching and learning principles to avoid teaching hardware and software technologies in an isolated manner. Technologies used for instructional delivery should form part of the cohesive components of instruction; they should not be detachable objects.

An ongoing action research project has shown that most in-service teachers have a narrow view of technology integration. When they were asked to briefly state why they need to appl y technology in their teaching, most of the student teachers (70%) maintain that it is a tool for instruction; they fail to relate it to pedagogy or identify how it will help them to improve their teaching or facilitate learning. An educator who does not understand the purpose of technology integration or how it could be applied is less likely to achieve success in a technology-based learning environment. Eby J.(1997) warns that "technology could not support learning without teachers who know how to use it and integrate it into subject-specific area."

From the point of view above, we must first of all say that we need to expand the scope of technical thinking, which has been studied for many years by students in the process of integrating technology into teaching and learning. The use of a wide range of computer techniques and devices for the limited use of technology to support the education system requires direct technical thinking.

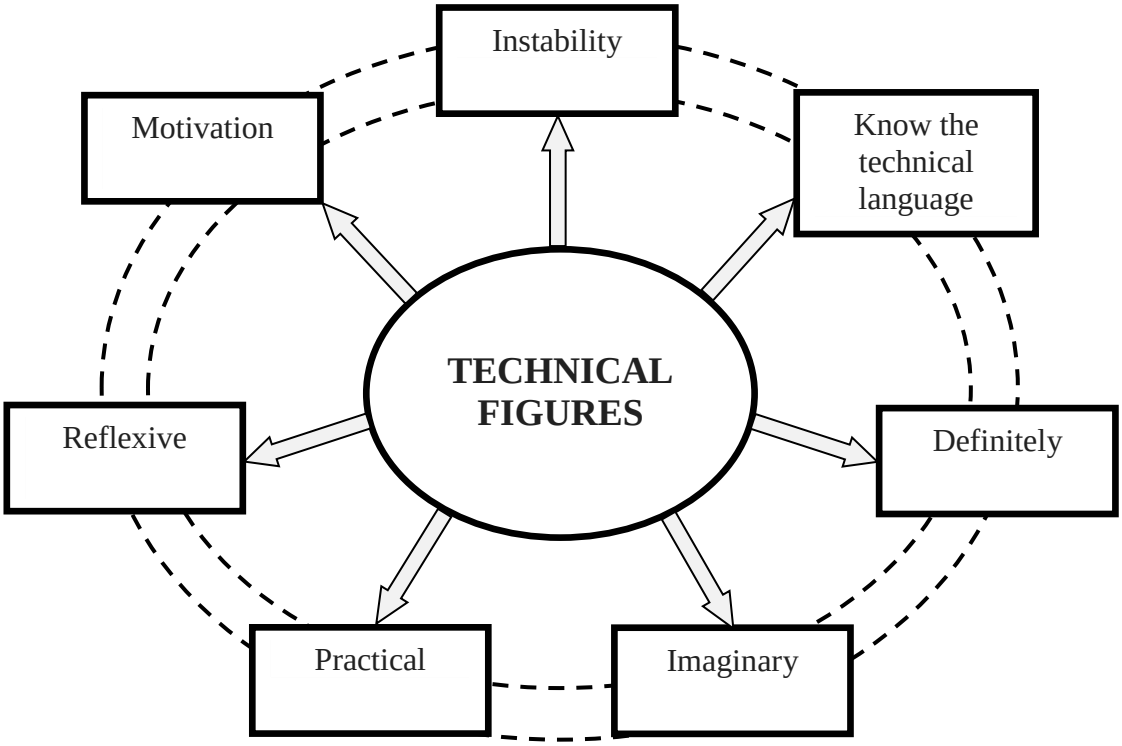
Technical thinking is a complex of intellectual processes and their results, which provide the solution of technical and technological activity issues (engineering, technology, which is the repair and maintenance of devices and others). An analysis of sources of technical thinking has helped us to identify the following features: technical thinking can be seen in technical issues

solving and understanding; It has a technical thinking structure, which includes conceptual, imaginative, practical (TV Kudryavtsev), technical knowledge of language, and speed (MV Mukhina) components; technical thinking implies the existence of a system of knowledge and skills appropriate to the ongoing activities; technical thinking is the operational part of the technical ability.

Technical thinking is also shaped by thinking processes like analytical thinking (analysis, synthesis, generalization, comparison, abstracting, classification, etc.). Its uniqueness is that the above-mentioned operations in technical activities are carried out in technical materials.

We have summarized the results of T.V. Kudryavtsev, M.M. Mukhina and S.Planida and took into account the cardinal changes in the recent years in the world of technology, the seven-component structure of the technical thinking as an integral system of technical teachers (motivation, efficiency, knowledge, conceptual, imaginative, practical, reflexive), the interconnection of its components, and the role of each of them when implementing intellectual processes with technical objects (Figure 1).

Based on this, teachers have identified the following components of technical thinking, formed in students. They are motivational, fast, technically proficient, conceptual, imaginative, practical and reflexive.



Picture 1. The structure of technical thinking in students

Integration of technologies requires the rational use of the technical thought structure in students, including the consideration of issues related to education and training, development of learning objectives, selection of teaching methods, feedback and evaluation, evaluation strategies. A comprehensive study of technology integration creates a basis for teachers to further the educational process in the audience.

Convenience - is understood as correcting or routing the work quickly and in a timely manner, problem solving, and other capabilities.
Knowledge of the technical language is related to the adaptation of schemes and drawings to the existing details and devices.
The conceptual component - the technical concepts - conditional definitions in schemes, special concepts, conditional graphic-symbolic characters in various schemes and drawings.
An illustrative component - an ability to visualize complex systems of images and to create them.
The practical component - the experimental investigation of the results.
Reflexive component - refers to the idea of self-observation, self-awareness, understanding of the individual's actions and their rules, understanding of internal psychological acts and situations by the subject.

Relationship between Technology in Education and Pedagogy
A major part of the problem related to technology integration is that most educators have not addressed the pedagogical principles that will guide their use of technology for teaching and learning. The intricate relationship between technology and pedagogy has not been adequately explored. As teachers explore the process of technology integration and search for ways that it can be effectively accomplished, they will develop the rationale to examine the appropriateness of the technologies they are using and whether such technologies are compatible with their lesson plan and learning outcomes. The process of exploring the relationship between technology in education and pedagogy will encourage critical thinking on the part of teachers as the y practice technology inte gration. Mezirow (1990) argues:

That thinking criticall y involves our recognizing the assumption underlying our beliefs and behaviors. It can give justifications for our ideas and actions. Most impor - tant, perhaps, it means we try to judge the rationality of these justifications. (p. XVII).

The authors of this paper have observed that during the course of their teaching, education students were asked to discuss why they would like to use technology for teaching and learning. A great majority of them said that they use technology (more specifically computers) for instruction because it helps teachers to teach and students to learn. This response is too general and does not convey an in-depth understanding of technology inte gration. These students fail to articulate in any meaningful way how technology can be used to improve learning. Their response does not capture the intricate relation - ship between pedagogy and technological resources. Lack of appropriate guidelines limit teachers' use of technology for instruction, and limits their desire to explore the use of technology beyond basic applications. Weizenbaum (1976) argues that "computers can be a powerful metaphor for understanding many aspects of the world." However, he states "it enslaves the mind that has no metaphors and few resources to call on—the mind that has been educated with onl y facts and skills" (p. 51). It is important that practicing teachers and in-service teachers recognize that technology in education is considered part of pedagogy.

Technology should be implemented in the classroom only if its role in a given instruction is determined along with pedagogical issues related to a given instructional task. The role of technology in education can only be determined if teachers who implement technology at the classroom level are involved in technology decision-making because teachers have the responsibility of facilitating instruction. Okojie et al. (2005) argue that school administrators make decisions about technology training without consulting teachers who will integrate technology into instructional process. Teachers who are in a better position to articulate their

needs and identify their weaknesses have minimal input in planning the technology training they receive. Thus, technology integration training becomes a general identification of various hardware and software technologies, which does not address specific learning problems nor pinpoint the way technology can be used to improve instruction (p. 5).

It is important that teachers recognize that a relationship exists between technology in education and pedagogical decision-making. According to Anderson and Borthwick (2002) research evidence shows that "participants whose technology instruction was integrated in their methods course reported more frequent use of technology for both teacher productivity and student projects during both on-campus courses and their first year of actual classroom teaching" (p. 5). There is no blueprint for technology integration, however, it is suggested that effort be made to link technology for instruction to all levels of pedagogical processes and activities as described next.

• Identifying learning objectives in a technology-based instruction requires teachers to select and/or adapt instructional technology to match the objectives based on the students' needs.

• Presenting instruction using technology as part of the instructional process requires teachers to choose the methods that are relevant to the objectives, the technology selected, learning styles, modes and pace of learning.

• Evaluating technology-based instruction requires teachers to select appropriate evaluation techniques that are relevant to the objectives, methods of instruction, and to technologies that have been used.

• Designing follow-up activities using technology requires teachers to select appropriate follow-up materials that are relevant to the objectives of the instruction and technologies that are accessible to the students as well as easy to use.

exnologiyadan foydalanib o'quv qo'llanmasini o'qitish jarayonining bir qismi sifatida taqdim etish o'qituvchilarga maqsadlar, tanlangan texnologiya, o'quv uslublari, usullari va ta'limning tezligi bilan bog'liq usullarni tanlashni talab qiladi.

• Developing course enrichment materi - als using technology requires teachers to provide opportunity for students to explore issues related to the course materials and to provide them with the opportunity to select and analyze course enrichment materials using technology in ways that broaden their problem-solving skills.

• Locating sources for additional instruc - tional materials using technology requires teachers to use the internet and multimedia networks to develop additional learning materials and expand instructional resources aimed at broad - ening the knowledge and the skill gained.

• Designing a dynamic classroom using technology requires teachers to provide a learning environment that is colorful, engaging, exciting, interactive and energetic as a way of encouraging students to venture into the world of technology and to discover knowledge for themselves.

CONCLUSION

The essence of this article is to provide insight on how teachers can improve their use of technology to support instruction. It explores pedagogical issues that are relevant and need to be considered in order to successfully apply technology into teaching and learning. It is important that educators perceive technology in education as part of the pedagogical process. This article also recognizes the relationship between pedagogy and technology in education. It is necessary that teachers understand the pedagogical principles that govern the application of technology into teaching and learning. Suggestions are made on how to improve technology integration. Educators are encouraged to view technology integration from a wider perspective

and be reflective in their teaching as they use technology to support and facilitate instruction. Technology integration should be considered as par t of the process of instructional preparation. Instructional technology should be identified at the planning stage just as the students' readiness is assessed, lesson objectives identified, methods of presenting are established, and e valuation strategies are determined. Follow-up activities should also be established at the planning stage. Poor implementation of technology integration is likely to affect the desired outcome.

References:

№	Reference	Литература
1.	National Program for Personnel Training. T.1992.	Национальная программа обучения персонала. Т.1992.
2.	Ausubel, D . P. (1978). Educational psychology: A cognitive view . (2nd ed.). Ne w York: Holt, Rinehart & Winston	Осубель, Д. П. (1978). Педагогическая психология: когнитивный взгляд. (2-е изд.). Нью-Йорк: Холт, Райнхарт и Уинстон
3.	Lever-Duffy, J. McDonald, J. B. & Mizell Al P. (2005). Teaching and learning with technology. San Francisco: Pearson	Lever-Duffy, J. McDonald, J. B. & Mizell Al P. (2005). Преподавание и обучение с использованием технологий. Сан-Франциско: Пирсон
4.	Anderson, C. L. & Borthwick, A. (2002). Results of separate and integrated technology instruction in pre-service training . ERIC Reproduction Document # IR021919, p.14.	Anderson, C.L. & Borthwick, A. (2002). Результаты раздельной и интегрированной технологии обучения в предпродажной подготовке. Репродукция документа ERIC № IR021919, стр. 14.
5.	Azizkhodjaeva N. N. Pedagogical technologies and pedagogical skills. - T .: Finance, 2003. -192-198 pages	Азизходжаева Н. Н. Педагогические технологии и педагогические навыки. - Т .: Финансы, 2003. -192-198 с.
6.	Z.Ismoilova. Ptdagogika. Tashkent. Molia. 2010. 153 p	К.Исмаилова. Педагогика. Т. Молия 2010 г. Стр. 153
7.	Bazeli, M, (1997). Visual productions and student learning. ERIC Reproduction. Fall The Journal of Technology Studies 71	Базели, М. (1997). Визуальные постановки и обучение студентов. Эрик Репродукция. Осень. Журнал технологических исследований 71
8.	Z.Ismoilova.Tarbiyaviy ish methods. Tashkent.Istiklol.2003.150 p.	К.Исмаилова. Методика преподавания .Т. Истиклол 2003 г. стр.150
9.	Bosch, K.A. & Cardinale, L. (1993). Preservice teacher' perceptions of computer use during a field experience. Journal of Computing in Teacher Education, 10(1), pp. 23-27	Bosch, K.A. & Cardinale, L. (1993). Preservice учение восприятия исполь-зования компьютера во время полевого опыта. Журнал информатики в педагогическом образовании, 10 (1), с. 23-27
10.	Duranov M.E. Professional and pedagogical activity and research approach to it. Monograph / M.E. Duranov. - Chelyabinsk: ChGAKI, 2002. -276 p.	Дуранов М.Е. Профессионально-педагогическая деятельность и исследовательский подход к ней. Монография / М.Е.Дуранов. – Челябинск: ЧГАКИ, 2002. -276 с.

11.	Efremov A.V. Methodical recommendations on the organization of the educational process (implementation of experimental programs) / A.F.Efremov, EL.L.Belkin. - M., 2002. - 137 p.	Ефремов А.В. Методические рекомендации по организации учебного процесса (реализация экспериментальных программ) / А.Ф.Ефремов, Е.Л.Белкин. – М., 2002. – 137 с.
12.	Slastenin / *V.A.Slastenin* [V.A. Slastenin]. Moskow, Publishing House Magistr-press Publ., 2000. 448 p.	Сластенин / В.А.Сластенин. – М.: Издательский Дом Магистр-пресс. 2000. – 448 с.
13.	Diaz, D. P. & Bontenbal, K. F. (2000). Pedagogy-based technology training. In P. Hoffman & D. Lemke (eds.), Teaching and Learning in a Network World, pp. 50-54. Amsterdam, Netherlands: 105 Press	Диаз Д. П. и Бонтенбал К. Ф. (2000). Педагогические технологии обучения. В P. Hoffman & D. Lemke (ред.), «Преподавание и обучение в сетевом мире», стр. 50-54 Амстердам, Нидерланды: 105 пресс
14.	Eby, J. (1997). Reflective planning, teaching and evaluation, K-12. Upper Saddle River, NJ: Prentice Hall	Eby, J. (1997). Рефлексивное планиро-вание, обучение и оценка, К-12. Аппер-Седл-Ривер, Нью-Джерси: Прентис Холл
15.	D.Himmataliev. Autoreference. Inte-gration of pedagogical and technical knowledge in the diagnosis of occupational activity preparation. T. (2018)	D.Himmataliev. Autoreference. Интеграция педагогических и технических знаний в диагностике профессиональной деятельности подготовки. Т. (2018)
16.	Fletcher, G. (1996). Former director of the Division of Educational Technology, Texas Education Agency, Executive Vice President of T.H.E. Institute quoted in T.H.E. Journal, 24(4), p. 87.	Флетчер Г. (1996). Бывший директор отдела образовательных технологий Техасского агентства образования, исполнительный вице-президент Т.Н.Е. Институт цитирует в Т.Х.Е. Журнал, 24 (4), с. 87.
17.	Mable SKO Okodzi, Anthony A. Olinzok and Tinukwa S. Okoji-Boulder. - Article. Pedagogy of technological integration. - Development of the University of Mississippi. - 2013	Мейбл СКО Окодзи, Энтони А. Олинзок и Тинуква С. Окоджи-Боулдер.- Статья. Педагогика технологической интегра-ции.- Развитие Университете штата Миссисипи.-2013 г.
18.	McGrail, E. (2005). Teachers, Technology and change: English teachers perspectives. Journal of Technology and Teacher Education, 13(13), pp. 5-23.	McGrail, E. (2005). Учителя, технологии и изменения: перспективы учителей английского языка. Журнал технологии и педагогического образования, 13 (13), с. 5-23.
19.	Bespalko V.P. Pedagogy and progressivnye texnologii obucheniya. - M .: IRPO, 1995. - 336 p.	Беспалько В.П. Педагогика и прогрессивные технологии обучения. – М.: ИРПО, 1995. – 336 с.
20.	Yuldashev Z.Kh., Ashurova D.N. Innovative-didaktic program complex and new formalized model of educftion. Malaysian Journal of Mathematical Sciences 6 (1):, P.: 97-103. (2012).	Юлдашев З.Х., Ашурова Д.Н. Инновационно-дидактический программный комплекс и новая формализованная модель обучения. Малазийский журнал математических наук 6 (1) :, С .: 97-103. (2012).
21.	http://www.istedod.uz/ http://www.pedagog.uz/ http http://://www.Abduqodirov.pbnet.ru/	http://www.istedod.uz/ http://www.pedagog.uz/ http://www.Abduqodirov.pbnet.ru/

	Htm1. www.gov.uz http://www.edu.uz www.tdpu.uz http://www.cer.uzl	http:// www.gov.uz http://www.edu.uz www http://.tdpu.uz http://www.istedod.uz w http://ww.cer.uz