Audiovisual aids application in the secondary-level vocational education establishments

Efficiency analysis and assessment

Elvir Munirovich Akhmetshin  
Department of Economics and Management, Elabuga Institute, Kazan Federal University, Elabuga, Russian Federation

Rinat Rivkatovich Ibatullin  
Department of Mathematics and Applied Information Science, Elabuga Institute, Kazan Federal University, Elabuga, Russian Federation

Almaz Rafisovich Gapsalamov, Vladimir Lvovich Vasilev and Sergey Yurevich Bakhvalov  
Department of Economics and Management, Elabuga Institute, Kazan Federal University, Elabuga, Russian Federation

Abstract

Purpose – The purpose of this paper is to analyze how the audiovisual teaching aids are applied in the modern educational environment and to assess their application efficiency in the context of the secondary-level vocational education establishments.

Design/methodology/approach – A pedagogical experiment was conducted to confirm this hypothesis. At the preparatory stage, the authors have analyzed the teaching and learning process, as well as students learning at the secondary-level vocational education establishment. Statistical sample was 300 people.

Findings – Based on the research results, main mistakes made while applying the audiovisual teaching aids were identified, formulated and investigated. These mistakes were related to the insufficient methodological preparation. As these mistakes were eliminated, student achievements and learning skills have increased by 15–20 percent (experiment data). The average marks, obtained by students before and after eliminating the methodological mistakes, were taken in points (from 2 to 5) as achievement and learning skill criteria.

Research conclusion is that audiovisual aids application quality can be improved only through the research on students’ educational and creative potential, their perception of various learning materials, and their preferences in the information structure, composition, types and forms.

Originality/value – Applying audiovisual teaching aids in the learning process is a challenge. This paper is driven by the need of new unique methods for applying audiovisual aids related to identifying the optimal temporal lesson structure, as well as the composition and the amount of auxiliary teaching materials, interactive communication level and ways to stimulate the emotional and creative activity of students.

Keywords Audiovisual teaching aids, Cognitive interest, Creative development, Education efficiency assessment, Educational innovations management, Secondary vocational education

Paper type Research paper

Introduction

Modern world and human activity are characterized by high rates of information and knowledge growth. In this regard, effective tools for intensifying the learning process are required. Currently, audiovisual teaching aids are widely applied in the teaching and learning process (Salasiah et al., 2018). The general problem of applying audiovisual teaching aids is to find ways to apply them most effectively. Audiovisual teaching aids are well known as tools...
that allow updating the information, increasing the perception level and improving the
cognitive interest of students (Deal et al., 2017). Moreover, media technologies allow not only
the students, but also the teachers to improve their qualifications. Pedagogical experiments,
conducted in this area, confirm the positive impact of audiovisual teaching aids on teacher’s
performance, as they allow developing teacher’s creative and communication abilities (Arnold
et al., 2009). Synchronous (video communication) and asynchronous (e-mail) communication
means, as well as the interactive media, allow turning the distance learning into an effective
learning tool for everyone, regardless of distance or time deficit (Curran, 2006). The
audiovisual aid application is multicultural and multidisciplinary. In the context of speech-to-
speech translation technology development, audiovisual training aids are applied in arts and
sciences, for teaching medicine, music, business, psychology, technical professions and
specialties in the field of services (Ingraham, 2006).

Audiovisual aids are currently a broad concept. In our research, audiovisual aids as
regarded as the entire wide range of special technical means allowing to deliver the
information and knowledge to the students through the visual and audio channels of human
perception and communication. At this point, we can allocate two groups of technologies
suitable for audiovisual aids application:

(1) off-line technology – video films, audiobooks, electronic presentations, spreadsheets
and programs for calculating problems; and

(2) on-line technology – network video and audio resources, other internet
materials, open databases, interactive platforms for discussing scientific and
practical problems.

In our research, audiovisual aids are studied as a single group of special teaching tools
intended for increasing the teaching effectiveness. We did not analyze the effect that
audiovisual aids have on the learning process depending on the technological support, since
this was not our research objective.

The current specific problems of applying audiovisual teaching aids are centered around the
application methods improvement. This cluster of issues is constantly changing and becoming
more complex, since application methods depend on modern possibilities of science, technology,
information and communication technologies (ICT). The variety of modern technical support
stands next to a variety of methodological approaches toward the audiovisual aid application
depending on the conditions and tasks of their application (Park and Gang, 2013). The process of
developing social networks, the internet, webcasts and other networks (sites for storing video,
such as YouTube) allows expanding the possibilities of applying audiovisual teaching aids.
Lecture, training and lab sessions are held using the YouTube resources. Scientists note that
public information sources make it possible to extend the learning process and to integrate it
with student’s independent and creative activity (Jaffar, 2012).

The audiovisual aids are applied directly for developing professional skills, for example –
skills of designing various construction projects, interior, cars, industrial goods, biology,
chemistry and medicine labs (Peden et al., 2016). Developing audiovisual teaching aids in the
form of Virtual Labs is a new trend. These aids can help the students to gain experience
without direct physical involvement to solve different professional problems. Computerized
calculations, models, video, animation and other training technologies are used as part of an
interactive learning process (Ray et al., 2012).

The audiovisual aids are being improved simultaneously in terms of methodological and
technical support (Aina and Adekonye, 2013). In other words, modern technical means are
used to improve their efficiency. This allows providing the feedback between the teacher
and the students. Technical capabilities allow analyzing what opinions the students have
and their wishes for improving the learning process. This makes it possible to improve the
audiovisual aids application methods (Rushinek and Rushinek, 2010). The audiovisual aids were especially relevant in the context of accelerated business development that required a rapid learning of modern information technologies used in business. Audiovisual teaching aids were used to teach modern business applications. At this point, users were appealing for training, indicating what information they had to receive and what knowledge required a deeper study (Vidačić and Pihir, 2010).

Researchers note that ICT, including computer technology, software, networks and other technologies, such as audio, video and other media tools, have changed the nature of teacher’s performance and teacher-to-teacher interaction in order to solve professional problems (Krutka and Carano, 2016). Audiovisual teaching aids also contribute to the increased collaboration by organizing the general research topics, storing the general information on the internet, video conferencing, holding the interactive discussions in network blogs and providing feedback between scientists, teachers and trainees (Kamel Boulos et al., 2006).

Audiovisual teaching aids will not provide the necessary effect if they are used incompetently without the necessary methodological preparation and teaching materials, and with the violation of psychological and pedagogical requirements (Vidačić and Pihir, 2010). Other scientists believe that audiovisual aids application efficiency depends on such components as the methodological preparation, teacher’s knowledge of the technical support, innovation technology application and teacher’s creativity (Mathew and Alidmat, 2013). In addition, scientists have identified the following difficulties, which any teacher can face while applying the audiovisual teaching aids: poor equipment maintenance, incompetent use of technical means and the problem of selecting audio and video content (Şahin et al., 2016). We have considered these factors as well. This research has shown that some of these factors have affected the teaching and learning process in the secondary-level vocational education establishments in the Republic of Tatarstan.

As previously noted, audiovisual aid efficiency turns to higher (experiment data) than in the case of traditional teaching methods (oral speech and physical communication with students). At the same time, audiovisual teaching aids were proved to be inefficient without a previously developed application methodology when it comes to improving the learning outcomes (Pisarenko and Arsaliev, 2017). In some cases, for example – due to information overload, audiovisual aids application may lead to a decrease in teaching quality (Ozer et al., 2017).

As a result, there is a contradiction between the process of applying various audiovisual teaching aids in the secondary-level vocational education establishments and the insufficiently developed methodology of their application. This contradiction forms the backbone of the research problem, determined its relevance and content.

Let us consider this contradiction in more detail. There are the following reasons for this contradiction to arise and strengthen.

First, gender difference sparks the choice of an audiovisual aid application method in different ways. The existing studies on audiovisual aids application have illustrated the students’ preferences in using video and animation before a simple Power Point presentation. Scientists note that girls prefer the handouts with the possibility of recording the lecture comments while boys prefer the handouts with ready-to-read lecture comments. This indicates that the audiovisual resources perception level among listeners is different, and that, the lesson, which structure includes the audiovisual aids (video, animation and ready comments), should be based on the assessment of students’ preferences and perceptions (Panda et al., 2015).

Second, audiovisual aids should be applied carefully, since the individual perception of information and knowledge differs. Scientists believe that audiovisual teaching aids can both positively and negatively affect the teaching and learning process depending on how the individual characteristics of students were taken into account. For example, it was suggested to simultaneously teach students the new words and to show them pictures
illustrating these words for better English learning. As a result, memorability was improved. Thus, audiovisual teaching aids bring to the learning process the opportunities for associative thinking, building a logical connection between the semantic and visual images. In the case of methodologically incorrect selection of situations for the audiovisual aids to be applied or their application without taking into account the individual characteristics of students, there may be a negative effect. The audiovisual aids will make it difficult to learn information and generate knowledge. That is why scientists call for applying audiovisual aids in teaching with special care and attention (Nelson, 2016).

Third, audiovisual aids application degree and frequency can lead to an overload with information and to a lower learning potential. Thus, audiovisual teaching aids can improve the student-to-student interaction. Videos and illustrations allow organizing a joint discussion and developing both personal and collective opinions. The received results indicate a development of students’ thinking activity and communication skills. Such a trend is also confirmed by other scientists (Al Mamun, 2014). The musical accompaniment can also be important when it comes to the learning process efficiency (Watkins, 2015).

The described above reasons boost the topicality of the research on the optimal methodological support for audiovisual aids application.

The purpose of this research is to analyze how the modern audiovisual teaching aids are applied and to assess their application efficiency in the context of the secondary-level vocational education establishments.

**Methods**

A student poll was conducted in the secondary-level vocational education establishments of the Republic of Tatarstan within the framework of a research on modern demands and opportunities for audiovisual aids application. The sample group included 300 students (boys – 55 percent; girls – 45 percent). The average age of respondents is 20 years. The sample group included students, who began to take “The Social Studies: Economics and Law” course. Audiovisual aids were applied upon learning the course. The interviewees had an experience in learning by means of the audiovisual teaching aids during 36 academic hours. “The Social Studies: Economics and Law” course was planned to be taught for another 36 h after the survey and after eliminating all mistakes that were identified during the process. There were three teachers at the survey. The survey was conducted within one working day in the secondary-level vocational education establishments. The Microsoft Excel spreadsheet was used to organize and analyze the results of the survey. The respondents have written a consent for us to use their personal data. Refusers did not participate in the survey. The statistical error was 5 percent.

The questionnaire included 17 questions related to student’s attitudes toward the audiovisual aids application in class and their application efficiency/reasonability assessment (Table I).

Based on the questionnaire analysis and the learning process quality assessment, we have identified the mistakes made during the application of audiovisual teaching aids in the secondary-level vocational education establishments of the Republic of Tatarstan. A pedagogical experiment was conducted after revealing and eliminating these mistakes. The experiment goal is to prove that audiovisual aids application in “The Social Studies: Economics and Law” course is effective after eliminating the identified mistakes.

Basic dependent variables involved the qualitative and absolute progress, as well as the student’s proficiency level. Recommendations made to eliminate the mistakes were taken as an independent variable.

The experiment was carried out within the framework of “The Social Studies: Economics and Law” course in the secondary-level vocational education establishments of the Republic of Tatarstan.
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<thead>
<tr>
<th>Question</th>
<th>Options</th>
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<tr>
<td>Personal data (group, age, sex)</td>
<td>Group number: ________</td>
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<tr>
<td>Age: ________</td>
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<tr>
<td>Sex: ________</td>
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<tr>
<td>1. What do understand the concept of audiovisual teaching aids?</td>
<td>(answer at length)</td>
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<tr>
<td>2. What are the most important reasons for choosing the audiovisual</td>
<td>1. Aids contribute to better clarity and higher concretization of concepts, phenomena, events</td>
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<td>teaching aids as the teaching tools? (pick several options)</td>
<td>2. Aids enrich the range of ideas and satisfy the curiosity</td>
</tr>
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<td></td>
<td>3. Aids increase the interest in learning</td>
</tr>
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<td></td>
<td>4. Aids contribute to cognitive activity activation, conscious learning and thinking development</td>
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<td></td>
<td>5. Aids illustrate the theory and practice relationship</td>
</tr>
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<td></td>
<td>6. Other reasons (answer at length)</td>
</tr>
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<td>3. Do the audiovisual teaching aids provide more effective opportunities</td>
<td>1. Yes, since they represent such teaching principles as visualization, reality touch, accessibility and positive emotional background</td>
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<td>for organizing the learning process?</td>
<td>2. No, since the learning process can be quite effective without the audiovisual aids</td>
</tr>
<tr>
<td></td>
<td>3. Not sure</td>
</tr>
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<td>4. How often are the audiovisual teaching aids used in your education</td>
<td>1. Aids are not used</td>
</tr>
<tr>
<td>establishment?</td>
<td>2. Occasionally</td>
</tr>
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<td></td>
<td>3. Teachers adequately and consistently include audiovisual aids into the learning process</td>
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<tr>
<td></td>
<td>4. Teachers are introducing new material by means of audiovisual aid throughout the whole lesson (or its part) without a pause</td>
</tr>
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<td>5. Are the conditions sufficient to organize the learning process with</td>
<td>1. Yes, they are sufficient</td>
</tr>
<tr>
<td>the audiovisual teaching aids?</td>
<td>2. No, since the classroom procurement is bad</td>
</tr>
<tr>
<td></td>
<td>3. No, since the aids application methods should be improved</td>
</tr>
<tr>
<td>6. How do you feel about applying audiovisual teaching aids in class?</td>
<td>1. I like that. It increases my interest in learning and positively motivates me</td>
</tr>
<tr>
<td></td>
<td>2. It was interesting at the start, but then became boring</td>
</tr>
<tr>
<td></td>
<td>3. The audiovisual teaching aids make the learning process more difficult due to my specific thinking activity</td>
</tr>
<tr>
<td></td>
<td>4. Not sure</td>
</tr>
<tr>
<td>7. At what courses the audiovisual aids should be applied?</td>
<td>1. Special courses</td>
</tr>
<tr>
<td></td>
<td>2. Elective courses</td>
</tr>
<tr>
<td></td>
<td>3. Special and elective courses</td>
</tr>
<tr>
<td></td>
<td>4. Not sure</td>
</tr>
<tr>
<td>8. What training resources would you like to see the most during the class?</td>
<td>1. Visual aids (tables, diagrams, static presentations, e-learning courses, etc.)</td>
</tr>
<tr>
<td></td>
<td>2. Audio educational media (audio-lections, audio text fragments, conferences, etc.)</td>
</tr>
<tr>
<td></td>
<td>3. Audiovisual aids (video fragments, movies, media presentations, etc.)</td>
</tr>
<tr>
<td></td>
<td>4. Not sure</td>
</tr>
<tr>
<td>9. How effective is the material memorization when the audiovisual</td>
<td>1. Memorization is better</td>
</tr>
<tr>
<td>teaching aids are applied?</td>
<td>2. Not all material is memorized better</td>
</tr>
<tr>
<td></td>
<td>3. No difference observed</td>
</tr>
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</table>

Table I. A survey on modern demands and opportunities for audiovisual aids application in the secondary-level vocational education establishments of the Republic of Tatarstan (continued)
There were two groups (21 and 29 people in each, respectively) selected for the experiment. The average age of students was 20 years. The sample group included those students, who have already passed this course (36 h) and who are going to take it. The experiment was attended by the following teachers: E.M. Akhmetshin, A.R. Gapsalamov, V.L. Vasiliev. The Microsoft Excel spreadsheet was used to organize and analyze the results of the survey. Students have written a consent for us to use their personal data. There were no refusers. The statistical error was 5 percent.

The Group 1 was presented as a control group, which students were learning by means of the most used teaching methods and aids. The Group 2 was an experimental group, which students were learning after the mistakes of audiovisual aids application were eliminated.

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
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| 10. Do teachers offer tests to check the level of audiovisual information memorization? | 1. Yes, they offer test on a regular basis  
2. Occasionally  
3. No, they do not |
| 11. At what stages of the lesson the audiovisual teaching aids should be definitely applied? | 1. At the warm up stage  
2. At the introduction stage  
3. At the practice stage  
4. At the closing stage |
| 12. Should the teacher take into account the audiovisual aids application frequency? | 1. Yes, since lessons over-enriched with audiovisual aids are taught at the expense of the basic ideas of the course topic  
2. No, since this aspect is not so important  
3. Not sure |
| 13. How can be used the audiovisual teaching aids after classes? | 1. Aids can be used at the planning period by means of the multimedia projector  
2. Aids can be used for the purpose of designing different games by subjects, for organizing the professional day celebrations  
3. Aids can be used for organizing various videoconferences, webcasts and virtual seminars  
4. Other fields of application (answer at length) |
| 14. What learning goals can be achieved by means of the audiovisual teaching aids? | 1. Learning the basic knowledge  
2. Knowledge systematization  
3. Self-control skills development  
4. Developing student’s motivation to learn  
5. Instructional support |
| 15. How can the student’s cognitive activity be activated by means of the audiovisual teaching aids? | 1. The student’s cognitive activity be activated through the problem-based tasks  
2. The student’s cognitive activity be activated through the new forms of creative activity  
3. The student’s cognitive activity be activated through the cognitive knowledge stimulating the cognitive interest primarily due to its content novelty  
4. Other fields of application (answer at length) |
| 16. What determines the quality of teaching by means of the audiovisual media? | 1. Teacher’s ability to combine his/her speech with visual information and to logically switch different teaching tools  
2. Novelty and richness of media techniques  
3. Audiovisual information testing  
4. Other factors |
| 17. Your recommendations for applying the audiovisual aids in your education establishment | (answer at length) |
The experiment was carried out in three stages (diagnostic, formative and ascertaining): (1) Diagnostic stage (one academic week, ten academic hours).

At this stage, we have determined the absolute and qualitative progress, as well as the student’s proficiency level in the control and experimental groups. The pre-experimental assessment was applied as a diagnostic tool designed for solving the problems of pedagogical experiment. The pre-experimental assessment results were analyzed and statistically processed. Such indicators as achievements, performance level and the proficiency level were used for calculations:

Achievements (qualitative progress)

\[
\text{Achievements} = \frac{\text{total excellent grades} + \text{total good grades}}{\text{total number of students}} \times 100\%.
\]

Performance level (absolute progress)

\[
\text{Performance level} = \frac{\text{total excellent grades} + \text{total good grades} + \text{total satisfactory grades}}{\text{total number of students}} \times 100\%.
\]

Proficiency level

\[
\text{Proficiency level} = \left( \frac{\text{total } "5" \times 20 + \text{total } "4" \times 35 + \text{total } "3" \times 25 + \text{total } "2" \times 15 + \text{total } "n/r" \times 5}{\text{total number of students} \times 100} \right),
\]

where \(n/r\) is the number of those, who were not rated for a certain reason. Non-rated students should not be factored into calculating the number of students.

(2) Formative stage (one academic week, ten academic hours).

At this stage, control students were learning according to the established program, while the students from the experimental group – based on the developed recommendations for mistakes elimination. In each of the groups, five sessions were held on the following topics: Economics and Economic Science, Economic systems; Supply and Demand, Market Equilibrium; Labor Market and Unemployment; Inflation: Types and Causes, Anti-inflationary Measures; International Trade Organization, State Policy in the field of International Trade.

(3) Ascertaining stage (one working day, six academic hours).

At this stage, we have determined the absolute and qualitative progress, as well as the student’s proficiency level in the control and experimental groups. The post-experimental assessment results were analyzed and statistically processed. Experiment results were correlated with the set goal; the conclusions were drawn. The post-experimental assessment was applied as a diagnostic tool designed for solving the problems of pedagogical experiment. Such indicators as achievements, performance level and the proficiency level were used for calculating the effect of this experiment.

Results

The learning process organization and its main components should be considered in more detail in the context of secondary-level vocational education establishments in order to determine the efficiency of audiovisual aids application.

“The Social Studies: Economics and Law” teacher uses mostly the practical and verbal teaching methods (lecture, story, explanation, conversation, discussion, seminar) (Yılmaz and Kurtel, 2015). The knowledge source is a word transferred in the form of
teacher’s speech or a printed manual (textbook). In practice, this is the main source of information available for students. At this point, however, students often have to write down everything they hear instead of thinking the matter over. This leads to attention weakening and significantly affects the efficiency of training.

Audiovisual aids are the main knowledge sources, while the additional involve the “Social Studies” aid, handouts, textbooks and other manuals (Figure 1).

As a rule, teacher’s speech is a source of knowledge about facts, phenomena or their relations at the stage of knowledge consolidation, repetition, generalization and systematization. At the same time, visualization performs a function of confirming, illustrating or specifying those phenomena and relations that are imperceptible when it comes to hearing. Audiovisual information tests are offered only once in a while.

At this point, audiovisual aids may take 13 percent of class time at the warm up stage, 27 percent at the practice stage (learning), 7 percent at the production stage (solidifying) and 9 percent at the closing stage (Figure 2).

According to our observations, visual aids (static presentations) and the audiovisual aids (video fragments, movies) are the most frequently used (Figure 3). In the light of the course features, audio educational media (audio-lecions, audio text fragments, conferences, etc.) are not required.

Static presentations are simple presentations in the form of a slide show, where information is represented in a static manner as pictures and text. Presentations are created with the Microsoft Power Point and are the easiest media to create. The prepared presentation replaces the board to focus students on any illustration, information, formula,
etc., at the introduction stage. Visual teaching aids – static presentations – are used during “The Social Studies: Economics and Law” course occasionally.

At “The Social Studies: Economics and Law” course, video materials are used fragmentary or completely depending on the set goals. Video duration often exceeds the recommended length (over 35–40 min in total), turning the lesson into an audiovisual composition. This leads to rapidly developing fatigue, since it is difficult to continue the same activity during the class. The fatigue, in turn, leads to a decrease in attention.

The teacher uses various audiovisual aids (video fragments, video materials and movies) during “The Social Studies: Economics and Law” course occasionally.

At this point, course units are sometimes over-enriched with audiovisual aids at the expense of the basic ideas of the course topic, exercises, independent activity, etc. The teacher does not always manage to put in line other training resources, to find a possibility for switching them or to introduce those tools that best fit the learning goals and objectives.

Based on the poll, we can draw a conclusion that students understand the audiovisual aids as the following instructional teaching tools – presentations, video fragments, movies and audio records used in the teaching and learning process.

Thus, students have outlined the following important reasons for choosing audiovisual aids as teaching tools: better clarity and higher concretization of concepts, phenomena, events – 31 percent, increased interest in learning – 27 percent and cognitive activity activation, contribution to conscious learning and thinking development – 22 percent (Figure 4).

In the secondary-level vocational education establishments, lesson quality depends on the presentation and visual aspect of teaching, as well as on teacher’s ability to combine

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![Figure 3. Audiovisual aids application by types (in percent)](image1)

![Figure 4. The most important reasons for choosing the audiovisual aids for teaching (in percent)](image2)
his/her speech with images by using a variety of audiovisual teaching aids that have certain instructional capabilities. In this regard, students were asked to determine what learning goals can be achieved by applying the audiovisual teaching aids (Figure 5).

Audiovisual teaching aids occupy a special place among other teaching tools and have the strongest teaching impact, since they contribute to a figurative perception of learning material and its visual concretization in the form most accessible to perception and memorization. This was confirmed by 57 percent of respondents, who believe that audiovisual teaching aids provide more effective opportunities for organizing the learning process, since they represent such teaching principles as visualization, reality touch, accessibility and positive emotional background. Nevertheless, there is also another point of view: 37 percent of students note that the learning process can be quite effective without the audiovisual aids.

The absolute majority of students consider that there are enough conditions for organizing classes by applying audiovisual teaching aids. At the same time, 37 percent of respondents have noted that teachers adequately and consistently include audiovisual aids into the learning process, 40 percent of students believe that teachers use audiovisual training aids on a rare basis and only 23 percent of students suggest that teachers are introducing new material by means of audiovisual aid throughout the whole lesson without a pause.

Thus, 77 percent of students have noted that they liked when the audiovisual teaching aids were applied in class, as their interest in learning and positive motivation were intensified. At the same time, 16 percent of students have noted that audiovisual aids were interesting only at first couple of times; 7 percent of students believe that audiovisual aids were getting in the way of their specific thinking activity.

The audiovisual aids application level depends on the course. Students believe that audiovisual teaching aids are required in the case of special courses (37 percent), elective courses (29 percent) and both types of courses (24 percent). The remaining 10 percent of respondents found it difficult to answer the question.

Figure 6 shows that the majority of students (55 percent) would like to learn by means of audiovisual aids (video fragments, movies, media presentations, etc.), 31 percent of students preferred the visual aids (tables, diagrams, static presentations, e-learning courses, etc.), 10 percent of students – the audio educational media (audio-lections, audio text fragments, conferences, etc.) and only 4 percent of respondents found it difficult to choose the answer.

Audiovisual teaching aids are applied not only for knowledge presentations, but also for its control, consolidation, repetition, generalization and systematization. Therefore, they successfully perform all the teaching functions. At the same time, 63 percent of respondents...
have noted that their material memorization was improved after the audiovisual training aids have been applied, 27 percent of students believe that they could better memorize not all the material while and the remaining 10 percent did not notice any difference at all (Figure 7).

Visual information has a small developmental effect in case when the students are not asked to conduct tests intended to check how such information was memorized. The survey has revealed that only 27 percent of students believe that teachers regularly offer such tests while the majority of students (48 percent) have noted that teachers offer materials for repeating and solidifying. The remaining 25 percent of students have noticed that teachers do not offer them at all.

As for the audiovisual aids application frequency affecting the learning efficiency, 70 percent of respondents have noted that this factor is a prerequisite, since lessons over-enriched with audiovisual aids are taught at the expense of the basic ideas of the course topic. The latter leads to undesirable outcomes. The remaining 30 percent of students felt that this aspect is not so important (Figure 8).

The lesson can be enriched with the most up-to-date audiovisual aids, but the desired efficiency – the increase in the quality of knowledge and skills – will not be achieved. Moreover, it may be lower than in the parallel groups, where such aids were not applied. According to the interviewed students, aid-driven lesson quality primarily determines the teacher’s abilities to combine his/her speech with the audiovisual information and to switch different teaching resources (57 percent). Respondents consider that novelty and richness of media techniques (23 percent) and the audiovisual information tests (20 percent) are equally important.

The teacher has to think over where to apply a particular audiovisual teaching aid, depending on its instructional possibilities, before adding it into the lesson plan.
In this regard, students were asked to determine what lesson stages require the audiovisual teaching aids to be applied (Figure 9).

The teaching and learning is more successful if students have a positive attitude to learning, if there is a cognitive interest and the need for cognitive activity. Respondents believe that cognitive activity can be activated by means of the audiovisual aids through the problem-based tasks (57 percent); cognitive knowledge stimulating the cognitive interest primarily due to its content novelty (32 percent); new forms of creative activity (11 percent). Students have also noted that document material stimulates their interest in learning as well: photographs, drawings, manuscripts, old books, photo chronicles and records.

Based on the research results, we have identified the typical pedagogical mistakes that reduce the efficiency of audiovisual aids application during “The Social Studies: Economics and Law” course taught in the secondary-level vocational education establishments of the Republic of Tatarstan:

- insufficient methodological preparation;
- wrongly defined instructional role and place of audiovisual teaching aids, and the contradiction between the expressiveness of audiovisual aids and their instructional significance;
- unplanned and random application of audiovisual training aids; and
- over-richness turning the lesson into an audiovisual composition.

![Figure 8. Necessary consideration of the audiovisual aids application frequency in terms of its effect on the learning process (in percent)](image)

![Figure 9. Audiovisual aids application as a must for different lesson stages (in percent)](image)
In our opinion, audiovisual aids application will become more effective after eliminating these mistakes.

Data obtained after processing the pre-experimental assessment results are presented in Tables II and III.

Results presented in these tables show that both groups have, in fact, approximately the same performance and proficiency levels. Thus, we can claim that experimental setting was maintained.

Data obtained after processing the post-experimental assessment results are presented in Tables IV and V.

Based on the post-experimental assessment, we can state that performance level (absolute and qualitative progress), proficiency level and the average group score, recorded in the control group at the end of the experiment, do not differ significantly from the figures recorded at the beginning of the experiment (Figure 10).

### Table II.
The pre-experimental assessment results: control group

<table>
<thead>
<tr>
<th>Grades</th>
<th>Number of students</th>
<th>Number of papers</th>
<th>Test day</th>
<th>Performance level, %</th>
<th>Teaching quality, %</th>
<th>Average score</th>
<th>Proficiency level, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>394</td>
<td>21</td>
<td>19</td>
<td>6 March 2017</td>
<td>5 6 5 3</td>
<td>84</td>
<td>58</td>
</tr>
</tbody>
</table>

### Table III.
The pre-experimental assessment results: experimental group

<table>
<thead>
<tr>
<th>Grades</th>
<th>Number of students</th>
<th>Number of papers</th>
<th>Test day</th>
<th>Performance level, %</th>
<th>Teaching quality, %</th>
<th>Average score</th>
<th>Proficiency level, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group</td>
<td>395</td>
<td>29</td>
<td>26</td>
<td>6 March 2017</td>
<td>6 8 8 4</td>
<td>85</td>
<td>54</td>
</tr>
</tbody>
</table>

### Table IV.
The post-experimental assessment results: control group

<table>
<thead>
<tr>
<th>Grades</th>
<th>Number of students</th>
<th>Number of papers</th>
<th>Test day</th>
<th>Performance level, %</th>
<th>Teaching quality, %</th>
<th>Average score</th>
<th>Proficiency level, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>394</td>
<td>21</td>
<td>20</td>
<td>18 March 2017</td>
<td>5 7 6 2</td>
<td>90</td>
<td>60</td>
</tr>
</tbody>
</table>

### Table V.
The post-experimental assessment results: experimental group

<table>
<thead>
<tr>
<th>Grades</th>
<th>Number of students</th>
<th>Number of papers</th>
<th>Test day</th>
<th>Performance level, %</th>
<th>Teaching quality, %</th>
<th>Average score</th>
<th>Proficiency level, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group</td>
<td>395</td>
<td>29</td>
<td>27</td>
<td>18 March 2017</td>
<td>10 11 6 0</td>
<td>100</td>
<td>77</td>
</tr>
</tbody>
</table>
In the experimental group, the absolute progress has increased by 15 percent (thereby, reaching 100 percent), the qualitative progress – by 23 percent, proficiency level – by 15 percent. The average group score has increased by 0.53 (Figure 11).

Thus, we have achieved the goal of the pedagogical experiment, namely – substantiated the efficiency of proposed recommendations for eliminating the mistakes typical for audiovisual aids application during “The Social Studies: Economics and Law” course. These recommendations are based on the analysis of audiovisual aids application in the secondary-level vocational education establishments.

**Discussion**

This research has confirmed that audiovisual aids increase the learning process efficiency both in terms of student performance and learning skills, as well as in terms of time saving indicators. Many scientists come to such a conclusion (Manzoor, 2017).

Audiovisual teaching aids are a universal resource of pedagogical science. In the context of the quantum leap to nanoscale science, specialists are taught by means of the audiovisual teaching aids. In this case, research subject involves the DNA genetics, composition and structure (Ray et al., 2012).

Conducted analysis and the pedagogical experiment have shown that class activities organized by means of the audiovisual teaching aids should be based on the principles of

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**Figure 10.** Comparative performance/proficiency level analysis at the beginning/end of the experiment: control group (in percent)

**Figure 11.** Comparative performance/proficiency level analysis at the beginning/end of the experiment: experimental group (in percent)
modern education. “The Social Studies: Economics and Law” program should be oriented toward new approaches to organizing communication and cooperation in the class (Vasilev et al., 2016).

There is a variety of methodological approaches, including the audiovisual aids application: discussion with students, panel discussion, problem solving, situational method and the outside observation (Yılmaz and Kirtel, 2015). In our case, these methods were not used to teach “The Social Studies: Economics and Law” course before the experiment, but all of them were used after. This has yield some positive results and confirms the teaching and learning process, its methodological, technical and professional support should be comprehensively improved.

The initial mood of students for the audiovisual teaching aids is exceptionally positive. The task is to preserve this positive effect and transfer it to the processes of gaining knowledge, promoting the cognitive activity growth, not its decline (Wijekoon, 2016). In our case, positive effects were lost during “The Social Studies: Economics and Law” course before the experiment. The positive effect increased only after the revealed methodological mistakes were eliminated.

In the process of training the English teachers, audiovisual teaching aids, directly used in the listening process (students listen to the teacher’s voice and repeat after him/her), play an important role. Scientists note that a key role is played by the material introduction methods and by a metacognitive strategy (Salasiah et al., 2018). This strategy can be used in English teaching, where it is important to ensure the connection of word meaning with its visual image that arise in the student’s mind. This methodological approach was also used in the second part of our experiment, when we eliminated the mistakes by means of different methods, including the metacognitive strategy.

There are some differences when it comes to the methodological support in various fields of education. For example, health care providers are taught by means of the on-line surgery, when students see the process of providing medical assistance and hear the teacher’s comments. In this case, we can fully realize the specific features of medical training, when theoretical knowledge and practical skills are not separable from each other and audiovisual aids can most fully communicate this relationship to learners (Sugamoto et al., 2015). In the case of “The Social Studies: Economics and Law” course, there was no such acute necessity for combining theory and practice. However, audiovisual aids application in teaching courses related to business should be under a special attention in the future.

The lack of financial resources allocated for purchasing modern equipment and increasing teacher’s incentives to apply audiovisual aids is one of the reasons why audiovisual teaching aids are little applied. In some cases, raising teacher’s qualification would be reasonable, but this requires financial expenses and time. This is an obstacle to the audiovisual aids application in teaching (Ashaver and Igyuve, 2013). In our case, there was no such a problem with the application of audiovisual teaching aids in the secondary-level vocational education establishments of the Republic of Tatarstan. This can be explained by the fact that there has been recently a federal program implemented to modernize these establishments. There were also state investments made to create resource centers and develop education in this field.

The following subjects should be interested in the process of improving the audiovisual aids application: teachers, students and the administration. At the same time, teacher’s task is to prepare methodology in advance by using the audiovisual teaching aids. The administration’s task is to provide financial means for purchasing the necessary equipment. Student’s task is to perform and indicate the most desired way of using audiovisual aids for better interest and memorization (Rasul et al., 2011). In our case, there was also the fourth interested party – a potential employer. It is possible that joint training sessions conducted with the enterprise representatives will play a key role.
Let us highlight the factors of successful audiovisual aids application:

1. Assessment factor: the audiovisual training aids should be applied along with the specific types of training activity in order to increase the education efficiency. The teacher has also to monitor student’s activity systematically: formative and summative assessment in the form of testing, frontal surveys, oral responses and grading testing. Modern researches show that the phenomenon of control is still not fully disclosed, but its role in learning new knowledge is high enough (Pasyeka and Pasyeka, 2016). Our research results have revealed that assessment is an important factor affecting the audiovisual aids application effectiveness.

2. Audiovisual aids work out factor: aids application methodology should be worked out with regard to the individual characteristics of a teacher, students and educational goals. The level of audiovisual aids application depends on the course, student’s performance level and interest, study mode, teacher’s propensities and likings, available finances and the courseware. The audiovisual aids can be applied as an illustration, as a means of further clarification introduced for the purpose of deepening, specifying and enriching knowledge. Audiovisual training aids designed for “The Social Studies: Economics and Law” course can be used as a source of new knowledge and ideas about the objects, events or phenomena that students cannot directly observe. The teacher uses different video fragments and movies at the beginning of the lesson and before learning a new topic/section to evoke the necessary emotional mood in the class, to stimulate students’ interest in learning new things, and to make them ready for the new material (Graber and Holyk, 2012). Our research revealed some mistakes that were made in relation to the methodological support of the audiovisual aids application. As these mistakes were eliminated, the methodological background quality was improved. Thus, audiovisual aids application effectiveness has increased.

3. Cognitive motivation and group learning factor: providing for a constant student-to-teacher and student-student communication within the group. The audiovisual training aids, such as video fragments or movies, contribute to mental activity (attention and memory) development. Thus, audiovisual training aids help to create the atmosphere of joint cognitive activity. In this case, even an inattentive student usually becomes attentive, because students need to make some effort to understand the content. Audiovisual aids occupy a special place among other teaching resources and have the strongest teaching impact, since they contribute to a figurative perception of learning material and its visual concretization in the form most accessible to perception and memorization (Sugamoto et al., 2015). According to our research results, group learning and the cognitive motivation increase are of great importance for the effective audiovisual aids application.

In some cases, audiovisual aids make the learning process go harder. This problem solution requires specific preparation. The teacher has to plan not only his/her own activity, but also the activity of students. He/she has to plan the lesson as a course unit with specific organization and teaching methods. This thesis is confirmed by this research. The audiovisual training aids can be successfully applied if there is a certain methodological system designed for their application. This has a significant impact on the learning process integrity and structure, and makes the audiovisual aids application highly effective. The audiovisual training aids begin to benefit if the teaching goals and methods were set correctly: they save the teacher’s time, intensify the process of learning new knowledge and skills, increase the student’s cognitive interest, and expand the creative abilities of both the student and the teacher.
Thus, the problem of applying various audiovisual aids during “The Social Studies: Economics and Law” course comes down to searching for an effective application methodology, which would be based on the optimal use of audiovisual aids and would determine their compliance with the specific learning goals, tasks, material, modes, methods, material and technical support and opportunities.

Conclusions

The analysis of modern demands and opportunities for audiovisual aids application in the secondary-level vocational education establishment of the Republic of Tatarstan has shown that there is a need to develop methodological recommendations for organizing the learning process by means of audiovisual aids in order to achieve a greater application efficiency. The latter would make it possible to ensure the optimal use of these teaching aids and their compliance with the main learning goal and psychological-pedagogical requirements.

Based on the survey on audiovisual aids application, we have identified the following mistakes: insufficient methodological preparation; wrongly defined instructional role and place of audiovisual teaching aids, and the contradiction between the expressiveness of audiovisual aids and their instructional significance; unplanned and random application of audiovisual training aids; over-richness turning the lesson into an audiovisual composition.

A pedagogical experiment was conducted after these mistakes were eliminated in order to assess the quality of teaching by means of the audiovisual aids. The experiment has showed a 15–20 percent improvement after these mistakes were eliminated.

At the time of applying the audiovisual teaching aids, teachers should understand that visual, audio and audiovisual aid should be applied only when this application is methodologically substantiated. Lessons over-enriched with audiovisual aids are taught at the expense of the basic ideas of the course topic. The latter leads to undesirable outcomes.

The teacher should find the opportunity to logically switch different teaching tools, to introduce those audiovisual aids that will be most effective and to determine the best combination of different tools. These three statements are the most important provisions for the audiovisual aids application.

The audiovisual aids application during “The Social Studies: Economics and Law” course will make the teaching and learning process more meaningful, interesting, emotional, clearer and more effective. This, in turn, will positively affect both the student’s performance/proficiency level and the overall growth.

References


Corresponding author
Elvir Munirovich Akhmetshin can be contacted at: akhmetshinelvir@yahoo.com