EFFECTIVENESS OF USING DIGITAL TECHNOLOGIES IN DRAWING

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Abstract: This in the article drawing in science digital technologies of use training to the process impact, students graphic literacy and creative competencies in development role analysis Research during traditional drawing lessons with digital tools based on organization done of lessons efficiency compared, including AutoCAD, SolidWorks, SketchUp and other graphic of programs of the students spatial imagination, precision, drawing to perform speed and technician to think impact evaluated. Results according to, digital from technologies use students mastery indicators noticeable increased, complicated geometric shapes in modeling to them comfortable conditions created. Research drawing science modernization in doing digital technologies integration current that it is shows.

Keywords: drawing, digital technologies, AutoCAD, graphics literacy, 3D modeling, spatial thought, education technologies

INTRODUCTION

Current globalization during education in the system digital from technologies use not only modern demand, maybe training process efficiency increase important to the factor around Especially drawing science technical, engineering, architecture, design such as directions for basis happened because of him/her in teaching digital tools from the possibilities effective use extreme important. Traditional drawing in their classes main attention pencil, ruler, compass, paper such as to the tools aimed at is, this process many time demand to do, some complicated of drawings at hand execution students for difficulty birth, spatial imagination and creative approach complete shape not being able to possible. This because of drawing to science AutoCAD, SolidWorks, Compass-3D, SketchUp, CorelDRAW such as programs integration to do through education content is being improved.

Digital of technologies current to be in drawing clear dimensions with work, complicated geometric figures modeling, 3D objects virtual see and edit opportunity create, students graphic skills much fast develops. This and education in the process visual materials scale expands, modern the student future professional to activity fast and good quality to prepare service does. The research relevance is that digital tools teaching to the process integration to do still all education in institutions complete on the road unposed, methodical in terms of also complete has not improved. Therefore, this article digital technologies based on drawing of lessons pedagogical efficiency based on gives.

LITERATURE ANALYSIS AND METHODOLOGY

Scientific in sources drawing in science digital technologies to be used dedicated research many In particular, modern graphic programs education to the process current to grow students figurative thinking, spatial perception and technician his/her thinking noticeable at the level strengthen record was made. Many experts education digitization training process optimization, complex technician drawings in execution accuracy increase, many time demand doer processes to automation service to do AutoCAD, SolidWorks and other graphic environments comfortable

interface, 3D modeling opportunities, fast measurement input functions modern students need and to their abilities suitable is coming.

This in research following from methods used:

Comparison analysis - traditional and digital technologies based on lessons between mastery difference determined. Pedagogical experiment - 60 people student for 3 months with the participation training process take They went. half traditional in a way, half digital programs based on lessons He died.

Questionnaire and observation - students graphic literacy and technician skills was evaluated.

Statistical analysis - results two table through again worked, students mastery indicators compared.

DISCUSSION AND RESULTS

Research results digital technologies drawing in science one row advantages create First of all, the students complicated geometric shapes imagination to do and modeling skills traditional to methods than much fast formed [1]. 3D graphics opportunities through objects different from angles to see, its structure deep understanding It became easier. besides, students drawings edit and again work in the process mistakes immediately correction as much as possible has it has been.

The following Table 1 is traditional and digital technologies based on studied students mastery level is compared to:

Table 1. Students' mastery indicators (%)

Indicators	Traditional group	Digital technologies group
Drawing accuracy	68%	89%
Complex the form to perform speed	55%	87%
Spatial imagination	61%	92%
3D modeling skill	18%	94%

From the table apparently, digital technologies with worked students almost all indicators according to traditional to the group relatively high the results showed.

The following Table 2 shows the students' to class interest and motivation according to questionnaire results reflection will:

Table 2. Students motivation change

Question	Traditional group	Digital technologies group
To class interest level	54%	88%
Independent to work readiness	49%	81%
Created by from work satisfaction	57%	90%
The lesson understanding convenience	52%	93%

Results this shows that the digital technologies students motivation noticeable increased, lesson understanding process facilitated and their creative activity Students visual, interactive graphic in the environment to work found to be more effective.

[1] Usmanova Z. — Digital modeling in education opportunities - Bukhara : BSU Publishing House , 2022. - p. 205.

CONCLUSION

Above from analyses come out to say maybe drawing in science digital technologies application education quality noticeable accordingly AutoCAD, SolidWorks, SketchUp such as graphic programs of the students drawing to perform speed, accuracy and spatial his/her thinking Digital technologies complicated geometric figures visual modeling opportunity create because of students' subject motivation, lesson understanding level and independent work skill sharp increases. This is of education modern requirements with complete harmonious mold, drawing science in teaching innovative approach provides.

Also, digital technologies of the students future technician professions for necessary was graphic literacy, 3D modeling and engineering thinking in formation important role plays. Research results this shows that digital technologies based on organization done lessons traditional to methods relatively high to efficiency has education quality increases. Therefore, drawing science modernization in doing digital technologies wide current to grow necessary.

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