

Using the STEM Approach in Teaching Chemistry

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Abstract

This article chemistry STEM approach to teaching practical importance and efficiency research STEM education sciences one to one tie through in learners logical thinking , problem solution - oriented , scientific-creative ideas to develop The article is focused on to students lessons practice with tied without , from the STEM approach using their knowledge increase according to held research and their results analysis made and they based on recommendations working released.

LOGIN

Today on the day education in the system event fundamental reforms , science and technologies development , natural sciences teaching system update regarding practical affairs intense take Especially this in line chemistry science to teach develop important importance profession Because chemistry is the foundation of our lives . almost all in the fields used , daily marriage facilitates . In medicine medicines taking food in the field , village mineral fertilizers on the farm in the process of obtaining , soil the composition in improvement , industry , household chemical in life and ecology methods necessary . Therefore , chemistry science deep to teach , students chemistry to science interest increase , independent to search orientation , modern teaching methods working exit today's of the day current from the duties Chemistry science to teach development one how much effective methods available . Of these one is STEM education . STEM- (Science, Technology, Engineering, Mathematics) chemistry science other natural sciences with mutual integration did without teaching system . This method through learners chemistry science practice with tied in real life to problems critical approach , scientific solution do takes .

STEM education traditional from education difference is that general education in schools traditional education in recipients based on a DTS in a specific field of study designated knowledge , skill and qualifications to form focused on STEM education and based on DTS given knowledge , skill and of qualifications scientific in terms of how as daily life with dependence show through in the classroom

lesson training and from school outside education in the process students training research to conduct , experiments practical accordingly passing to see, to design directed creativity education , news to create was passion to increase focused.

MATERIALS AND METHODS

Research The object is 7th grade students .

Students number - total 12 (2 groups of 6) students).

Experience test :

Initially , experience 1-month club for of training work plan Chemistry to science interest according to general questionnaire Chemistry science according to knowledge through a 10- item test rated . 12 people students into 2 groups separated . Group 1 - traditional teaching system based on , Group 2 STEM education technology based on trained . Experience finally mastered by both groups knowledge through 20 tests evaluated . Results compared , table through expressed .

Research during following from methods used :

" To the project based task "(Project-Based learning). In this, the Topic on the surface project given to students information collects , analyzes they do , solution they give the result presented they do ;

" The problem based on "Problem-Based learning". In this, the teacher problematic situation to the surface brings , students search analysis and discussion through of the problem solution finds ;

" Groups with in cooperation Collaborative learning. In this, students small to groups separated , each one member own his/her opinion indicates and group become problem solution does . As a result in students cooperation , communication and responsibility skills is formed ;

" Research that is practical experience " (Inquiry-Based learning). In this, theoretical knowledge practical activity through they learn that is experience passed , the results analysis they do ;

" Situational analysis " (Case study). In this, real situations are study based on clear decisions acceptance to do is based on ;

" Cheerful " ball " method . In this, the teacher the ball one to the student transmits and question gives , ball received student to the question answer gives and the ball other to the student transmits , process continue will come ;

" 3D" method . Discover , Discuss , Develop method students knowledge independent learns , in a group discussion does and in the end own knowledge in practice support , conclusion releases ;

" Step" yes step " method . In this, knowledge ordinary to the complex looking at in sequence is given , every one stage to the previous one relied on without explained and strengthens ;

" Find a Friend " method . In this, students are asked to different questions and answers , concepts or cards distributed and they to oneself suitable the couple to find need will be ;

"6 hats " method . In this case, the problem or 6 different topics point of view from the point of view analysis are made : facts (white), emotions (red), critical opinion (black), positive aspects (yellow), creative approach (green), management (blue). This is called a STEM approach adaptation possible ;

"BBB" method . In this, I know , I want to know , knowing I got it. to departments topic according to previous knowledge , interest and result is determined ;

" Fish" "skeleton " method . In this, the problem reasons and consequences analysis will be done .

RESEARCH DISCUSSION

This research during students two to the group separated , first in the group traditional teaching methods , second in the group and To STEM based interactive methods applied . Obtained results this showed that interactive from methods used group of students knowledge level , lesson interest and independent thinking skills noticeable at the level high it has been .

The following from the table visible As you can see , entrance test scores traditional methods based on trained 60% in class , STEM approach based on trained 62% in class . By subject interest initially every both average in the group as well . In the lesson participation activity traditional methods based on trained 50% in class , STEM approach based on trained 65% in class . Independent affairs number and practical experience works STEM approach to numbers based on trained in class traditional methods based on trained to class than more . Experiment finally, according to science interest in STEM approach

based on trained in class noticeable at the level increased . Efficiency traditional methods based on trained increased by 11% in the classroom , STEM approach based on trained increased by 20% in the classroom . STEM approach based on trained in class traditional methods based on trained to class than science mastery process easier , more interesting and more efficient was .

Innovative and traditional methods based on trained students knowledge level and activity critical comparison

Table 1.

Indicators	Traditional methods based on trained class	STEM approach based on trained class
Entrance test scores	60%	62%
By science interest (initially)	Average	Average
In class participation activity	50%	65%
Independent affairs number (per week)	2 times	6 times
Practical experience works number (per week)	1 time	3 times
By science curiosity (experiment) at the end)	Average	High
Exit test scores (efficiency)	71% Increased by 11%	82% Increased by 20%

Such a result interactive of methods students lesson to the process active attraction to do , their practical activity through knowledge to master opportunity create with explanation possible . In particular , the project based on teaching and problem to solve directed assignments in students analytical thinking developed .

Research results other scientific research also compatible with comes , that is modern pedagogical approaches students activity increase and knowledge deeper to master help to give determined . With this together , some in students new to methods adaptation process initially difficulty It was also observed that the baby was born .

However research some to restrictions In particular , the participants number limitedness and of experience short within the period held the results generalization opportunity a little reduces . In the future further wider in the auditorium and far term research take to go to the goal appropriate will be .

CONCLUSION

Chemistry science in teaching modern interactive of methods current to be students knowledge level and science was interest to increase , critical thinking , scientific to research was interest to strengthen service will do . Conducted research and analyses this showed that chemistry STEM approach to science based on teaching education quality in increasing important importance has .

The research practical importance is that STEM based interactive methods education to the process current to grow students knowledge efficiency to increase service This will do . approach in school lessons wide application recommendation is being done.

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