World Bulletin of Social Sciences (WBSS)
Available Online at: https://www.scholarexpress.net
Vol. 14, September,2022
ISSN: 2749-361X

DEVELOPMENT OF TECHNICAL CREATIVE THINKING SKILLS OF GIFTED STUDENTS

Turakulova Marjona Kiyom kizi
Bukhara Engineering Technological Institute,
e-mail: gaxa8004@mail.ru

Article history:
Received: 6th July 2022
Accepted: 4th August 2022
Published: 20th September 2022

Abstract:
This article discusses such issues as methods of applying various methods and strategies in the development of technical creative skills and abilities of gifted students

Keywords: SCAMPER strategy, oil, gas production, rearrange, adaptation, maximization, problem, brainstorming.

INTRODUCTION. While experience and a constant method of exercises help to form technical creativity in gifted students, the teacher should teach students to use various strategies as a coach. You can help students understand that different ideas are divided into different categories (categories). For example: students give the names of petroleum products to the category ”petroleum products". A little later, students will first make a list of polyethylene to the category of ” gas products", and then other product names. The exercise continues in this way. This continues until students master the category, that is, the ability to move from one idea to another and quickly adapt to it. As soon as such a skill is formed in students, they can be required to think flexibly. For example, “from what raw materials could fuel products be obtained if there were no oil and gas in the world? and “with what strategy can we find an effective solution to the problem of depletion of oil and gas reserves in the future?”. Questions of different categories develop students' flexibility skills.[1-10]

MATERIALS AND METHODS. In order to prevent students from “getting stuck” in one category, a forced comparison strategy can be applied. For example: a teacher may be asked about how he can achieve that “re-equipment of the oil and gas industry with waste-free technologies”, “methods of drilling oil wells”, that is, about the possibility of obtaining efficient clean products in the oil and gas industry. This strategy helps to find connections between events and concepts through flexible thinking.

The SCAMPER mnemonic scheme, developed by Eberle many years ago, includes substitute (replace/change), combine (combine), adapt (adapt), modify (change/give a different shape), maximize/minimize (maximize/minimize), put to other uses (apply in another area/method), eliminate (avoid) and based on the application of strategies such as rearrange (changing applications), we were able to develop technical creative thinking skills in students.

1– Table
Development Of Technical Creative Thinking Skills Based On The Application Of The Scamper Strategy

Development of technical creative thinking skills using the SCAMPER mnemonic scheme to form flexible thinking skills		
SCAMPER	**Questions**	**Tasks**
Substitut	List the reasons for changing the type of absorbent when cleaning the gas from acidic components.	Make a list of options and find ways to improve it by choosing one of the ten.
Combine	What process happens if a demulsifier is added to a water-based emulsion?	Make a list of options and integrate a new productive idea into the process by choosing one of the ten.
Adapt	Which separator can be effectively used to separate liquid droplets from the gas composition?	Make a list of options and evaluate it by choosing one of the ten.
Maximize / minimize	What are the maximum and minimum temperatures in the distillation column?	Make a list of options and describe it by choosing one of the ten.
Put to other uses	In what other industries can gasoline be used for petroleum products?	Make a list of options.
Eliminate	What is being done to prevent	Make a list of options.

World Bulletin of Social Sciences (WBSS)
Available Online at: https://www.scholarexpress.net
Vol. 14, September,2022
ISSN: 2749-361X

	corrosion of pipes and equipment?	
Rearrange	What is the result of changing the method of adding odorant when giving the gas an odor?	Make a list of options.

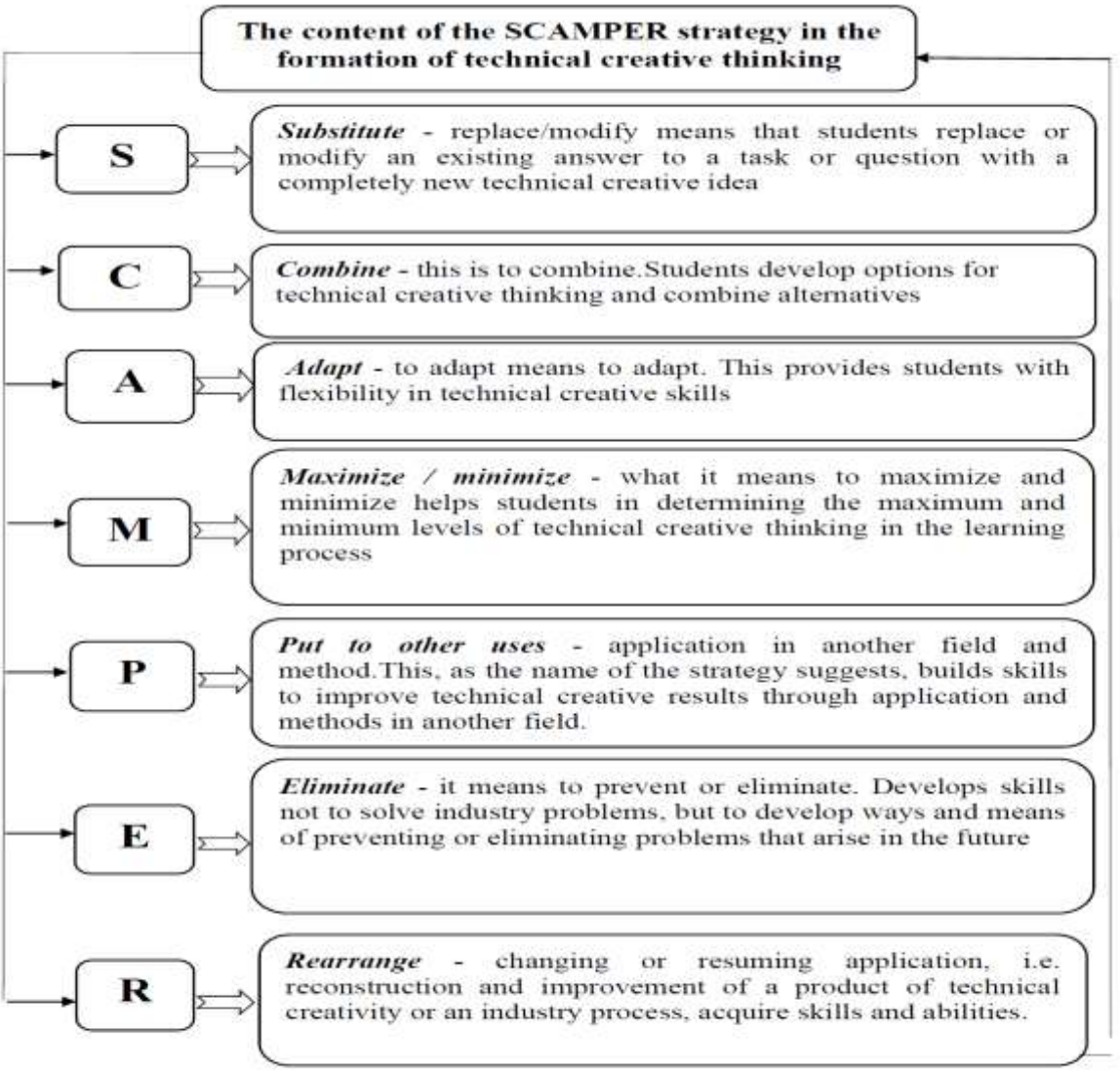
As mentioned earlier, SCAMPER is a set of questions to be asked during a brainstorming session (search for new ideas). Like any other tool, this strategy works effectively if the following conditions are met:[11-20]

the student understands the problem and can write it down (tries to use smart criteria for writing);

the student goes beyond his "standards" and uniformity;

at the stage of searching for ideas, you should not criticize the answers.

The problem can be different – from the creation of high-performance technologies related to production, to the search for new types of engineering projects, etc. The main thing is to formulate it as clearly as possible.It is necessary to try to highlight the object and subject of the problem (Fig.1).



1- picture. The content of the SCAMPER strategy in the formation of technical creative thinking

World Bulletin of Social Sciences (WBSS)
Available Online at: https://www.scholarexpress.net
Vol. 14, September,2022
ISSN: 2749-361X

During a lesson dedicated to technical creativity, as soon as a problem arises, you need to start brainstorming and ask questions from the sections. Not every question should have a solution, but some of them force the student to generate new ideas. Similarly, not all questions need to correspond exactly to science - some may seem repetitive, inappropriate, or even absurd in context. It is only necessary to skip them or try to rebuild some of them during the lesson [21-30].

What can be replaced to solve the problem? Specify the state of the process, type of equipment, quality of raw materials, technology, catalyst, physical quantities, operating principle, etc. An example in the form of the following questions:

Questions:

What can be replaced? For what purpose? From where? Where? When? How?

Which part can be replaced? What to use as raw materials?

Is it possible to replace the composition? Or material?

What about the replacement approach?

Which process would be more efficient? Another technological mode? Another goal?

Let's look at product features instead of features? Packaging?

Try switching between ideas. Is something new and interesting coming out?

Maybe you can change your point of view? Your way of thinking?

CONCLUSION. At the same time, the components of the lesson are also important in solving problems and creative thinking.The following are the components of the lesson on the subjects of the specialty that make up the methods of ensuring the development of the student's abilities for technical creativity:

learning objectives (educational, scientific, spiritual and moral, developing the activity of technical creativity);

learning objectives (improving the effectiveness of students' creative and creative activities, generalization of interdisciplinary knowledge);

to form creative abilities, to expand the cognitive circle of one's scientific thought, to analyze scientific literature, forms of education (collective, small-group, individual);

innovative teaching methods ("Violent attack of tougts", "method of Paradosks", "Critical thinking development technology", "Classic couple strategy");

didactic materials (educational literature, educational and service complex, explanatory technical dictionary, test kits, test papers, electronic educational resources);

didactic complexes (electronic whiteboard, flipchart, multimedia, training simulators, stands, layouts, a complex of technical and electronic learning basics (TED talks and playlists).[31-41]

REFERENCES

1. Mirziyoev Sh.M. Together we will build a free and prosperous, democratic country of Uzbekistan. Speech at the joint meeting of the chambers of the Oliy Majlis dedicated to the ceremonial inauguration of the President of the Republic of Uzbekistan. -Tashkent.: "Uzbekistan" NMIU, 2016. - 56 p.
2. M.Q. Torakulova, materials of the republican scientific-practical conference on "Innovative development of Samarkand region: problems and solutions", Samarkand 2020. - 248 p.
3. M.Q. Torakulova "Choosing types and means of education in working with gifted students". Pedagogical skills. Scientific-theoretical and methodical journal No. 5, Bukhara 2019. 104-108 b
4. Sarycheva M.P. Cursovaya work on the theme: "Osobennosti tvorcheskih khobnostey studentsov teknicheskih i humanitarnyx spetsialnostey" Taganrog 2011. St 5-7.
5. Mahmudov T., Talant khudojnika i obshestvo, Tashkent., 1972. St. 95.
6. M.Kh. Umarova, A.U. Akhmadaliev, A.B. Toraev, M.P. Imomov Educational-methodical complex on the module "Development trends and innovations of pedagogy" Tashkent - 2016
7. Sharipov Sh.S., Muslimov N.A. Technical creativity and design. Study guide. - Tashkent: TDPU; 2007. 206 p.
8. Sharipov Sh. S. Continuity of development of students' creative abilities in the vocational education system. - T.: Science, 2004. - 132 p.
9. Zagitova G.A. Web quest technology kak sposob obrazovatelnogo processa. Nizhnevartovsky social and humanitarian college. Khanty-Mansiysky AO. 2022 g
10. F.K. Iskandjanova, Yo.R. Rakhmonova. Faculty of medical pedagogy of the Tashkent Medical Academy "Professional pedagogy" teaching-methodological complex. Tashkent - 2017, pp. 23-25.

World Bulletin of Social Sciences (WBSS)
Available Online at: https://www.scholarexpress.net
Vol. 14, September,2022
ISSN: 2749-361X

11. Yevgeny Pavlovich Ilin Psychology of creativity, creativity, odarennosti.: Peter; SPb.; 2009. St. 25-30.
12. Sharov A.S. Tvorchestvo: istoki, mechanism, concept // Humanitarnye issledovaniya: Ejegodnik. Omsk, 1998. Vyp. 3.
13. Sharov A.S. Ogranichennyy chelovek: znachimost, activity, reflection. Omsk, 2000.
14. Kholodnaya M.A. Psychology of intellect: paradoxy issledovaniya. SPb.: 2002.
15. Kholodnaya M.A. Perspektivy issledovaniy v oblasti psikhologii knobnostey // Psikhologicheskiy zurnal. 2007. – No. 1. – S. 28–37.
16. Filimonenko Yu.I., Toropova O.B. Intuition: manifestation and psychological factors // Ananevskie chteniya: Materialy nauchno-prakticheskoy konferentsii. SPb.: 2007. – S. 250–251.
17. For M.V. Dynamics of intellect and creativity in the period of maturity // Ananevsky chteniya, 2007: Materialy nauchno-prakticheskoy konferentsii. SPb., 2007. - S. 252–253.
18. Fattakhova A.T. Psikhologicheskie faktori intuitsii (na primere atributsii lichnostnyx kachestv): Sbornik statey po materialam luchshih diplomnyx rabot vypusknikov fakultet psikologii SPbGU 2006 g. SPb.: 2007. – S. 136–141.
19. Suleymanov R.F. Psikhologicheskie osnovy professionalnogo masterstva muzykanta-instrumentalista. SPb.: 2003.
20. M.Q.Turakulova. Choosing types and means of education to work with gifted students. Pedagogical skills. Scientific-theoretical and methodical journal No. 5, Bukhara, 2019. - 104-108 p.
21. Sh.S.Sharipov. Continuity in the development of students' creative abilities in the system of vocational education. - Tashkent .: Fan, 2004. - 132 p.
22. Sh.S.Sharipov, N.A. Muslimov. Technical creativity and design. Tashkent - 2007. - 33-48 b.
23. Turakulova M.K.,Tukhtaeva Z.Sh.,// The role of interimedical integration in the formation of the creative activities of students// Eurasian Journal of Science and Technology. England: 2019. № 1 (2). – 7-8 pajes.
24. Tukhtaeva Z.Sh.,Turakulova M.K.,Turakulova B.B.Muminova M.S.Pedagogical innovation and the use of debate method in teaching technical sciences//International Engineering Journal For Research & Development. April 2020. Vol.5, Issue 3. Impact factor: 6.03 –151-155 pages.
25. Turakulova M.K.,Tukhtaeva Z.Sh, Nematova L.Kh., Ergasheva M.R., Azimova M.N., Khudoyberdieva S.N.// Opportunities for the development of creative abilities of the future teacher and student// Journal of Critical Reviews. 2020. Vol 7, Issue 12. – 103- 107 pages.
26. Turakulova M.K.,Rakhmonov K.S// Search, selection and planning of targeted training of talented students in technical universities// International engineering journal for research & development. 2020. Vol 5, Issue 3. –129-134 pajes.
27. Turakulova M.K.,Tukhtaeva Z.Sh., Rakhmonov K.S., Hasanova Z.D.//Technical creativity of students as a means of improving quality and the process of integrating their professional training// Annals of the Romanian Society for Cell Biology. 2021. Vol 25, Issue 3. –7048-7061 pages.
28. Turakulova M.K.,//Oliy ta'lim muassasalarida iqtidorli talabalarning texnik ijodkorlik qobiliyatlarini takomillashtirish mexanizmi va modeli// O'zMU xabarlari. Mirzo Ulug'bek nomidagi O'zbekiston milliy universiteti ilmiy jurnali. Toshkent: 2021. № 1/6. 214-217 b.
29. Turakulova M.K.,//Oliy ta'limda iqtidorli talabalar bilan ishlashning psixologik-pedagogik asoslari.// Psixologiya. Ilmiy jurnal. Buxoro: 2022. № 2. 164-167 b.
30. Turakulova M.K.,//Talabalar texnik ijodkorligini shakllantirishda shaxs kreativligi va kognitivligi// O'zMU xabarlari. Mirzo Ulug'bek nomidagi O'zbekiston milliy universiteti ilmiy jurnali. Toshkent: 2022. № 1/3/1. 161-164 b.
31. M.Q.Turakulova. Choosing types and means of education to work with gifted students. Pedagogical skills. Scientific-theoretical and methodical journal No. 5, Bukhara, 2019. - 104-108 p.
32. Sh.S.Sharipov. Continuity in the development of students' creative abilities in the system of vocational education. - Tashkent .: Fan, 2004. - 132 p.
33. Sh.S.Sharipov, N.A. Muslimov. Technical creativity and design. Tashkent - 2007. - 33-48 b.
34. Turakulova M.K.,Tukhtaeva Z.Sh.,// The role of interimedical integration in the formation of the creative activities of students// Eurasian Journal of Science and Technology. England: 2019. № 1 (2). – 7-8 pajes.
35. Tukhtaeva Z.Sh.,Turakulova M.K.,Turakulova B.B.Muminova M.S.Pedagogical innovation and the use of debate method in teaching technical sciences//International Engineering Journal For

World Bulletin of Social Sciences (WBSS)
Available Online at: https://www.scholarexpress.net
Vol. 14, September,2022
ISSN: 2749-361X

Research & Development. April 2020. Vol.5, Issue 3. Impact factor: 6.03 –151-155 pages.
36. Turakulova M.K.,Tukhtaeva Z.Sh, Nematova L.Kh., Ergasheva M.R., Azimova M.N., Khudoyberdieva S.N.// Opportunities for the development of creative abilities of the future teacher and student// Journal of Critical Reviews. 2020. Vol 7, Issue 12. – 103- 107 pages.
37. Turakulova M.K.,Rakhmonov K.S// Search, selection and planning of targeted training of talented students in technical universities// International engineering journal for research & development. 2020. Vol 5, Issue 3. –129-134 pajes.
38. Turakulova M.K.,Tukhtaeva Z.Sh., Rakhmonov K.S., Hasanova Z.D.//Technical creativity of students as a means of improving quality and the process of integrating their professional training// Annals of the Romanian Society for Cell Biology. 2021. Vol 25, Issue 3. –7048-7061 pages.
39. Turakulova M.K.,//Oliy ta'lim muassasalarida iqtidorli talabalarning texnik ijodkorlik qobiliyatlarini takomillashtirish mexanizmi va modeli// O'zMU xabarlari. Mirzo Ulug'bek nomidagi O'zbekiston milliy universiteti ilmiy jurnali. Toshkent: 2021. № 1/6. 214-217 b.
40. Turakulova M.K.,//Oliy ta'limda iqtidorli talabalar bilan ishlashning psixologik-pedagogik asoslari.// Psixologiya. Ilmiy jurnal. Buxoro: 2022. № 2. 164-167 b.
41. Turakulova M.K.,//Talabalar texnik ijodkorligini shakllantirishda shaxs kreativligi va kognitivligi// O'zMU xabarlari. Mirzo Ulug'bek nomidagi O'zbekiston milliy universiteti ilmiy jurnali. Toshkent: 2022. № 1/3/1. 161-164 b.