

CURRENT STATUS OF USING STORIES, COMICS, AND CARTOONS IN TEACHING CHEMISTRY IN THE DIRECTION OF DEVELOPING STUDENTS' CREATIVE PROBLEM-SOLVING COMPETENCE

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ARTICLE INFO	ABSTRACT
<p>Received: 21/11/2024</p> <p>Revised: 04/3/2025</p> <p>Published: 04/3/2025</p>	<p>Education in Vietnam has entered a period of innovation towards developing learners' attributes and competencies. Finding measures to develop competence in general and creative problem-solving competence in particular for students in high schools is necessary in the current context. Stories, comics, and cartoons are entertaining products that can be used to convey learning content to students gently and engagingly. This article presents the content and method of surveying 1191 students and 122 teachers to clarify the current situation of using stories, comics, and cartoons in teaching chemistry in high schools. The survey results have shown that using these learning tools in teaching chemistry has practical significance, contributing to developing creative problem-solving competence and enhancing students' interest in learning chemistry in the current educational period.</p>
<p>KEYWORDS</p> <p>Stories</p> <p>Comics</p> <p>Cartoons</p> <p>Creative problem-solving competence</p> <p>Chemistry</p>	

THỰC TRẠNG SỬ DỤNG TRUYỆN, TRUYỆN TRANH VÀ PHIM HOẠT HÌNH TRONG DẠY HỌC HÓA HỌC THEO HƯỚNG PHÁT TRIỂN NĂNG LỰC GIẢI QUYẾT VẤN ĐỀ VÀ SÁNG TẠO CHO HỌC SINH

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THÔNG TIN BÀI BÁO	TÓM TẮT
<p>Ngày nhận bài: 21/11/2024</p> <p>Ngày hoàn thiện: 04/3/2025</p> <p>Ngày đăng: 04/3/2025</p>	<p>Giáo dục ở Việt Nam đã bước vào giai đoạn đổi mới theo hướng phát triển năng lực và phẩm chất cho người học, việc tìm ra các biện pháp để phát triển năng lực nói chung, năng lực giải quyết vấn đề và sáng tạo nói riêng cho học sinh ở trường phổ thông là cần thiết trong bối cảnh hiện nay. Truyện, truyện tranh, phim hoạt hình là những sản phẩm mang tính giải trí cao và có thể được sử dụng để truyền tải các nội dung học tập đến học sinh một cách nhẹ nhàng và hấp dẫn. Bài báo này trình bày nội dung và phương pháp khảo sát 1191 học sinh và 122 giáo viên nhằm làm rõ thực trạng sử dụng truyện, truyện tranh và phim hoạt hình trong dạy học hóa học ở trường trung học phổ thông. Kết quả khảo sát cho thấy việc sử dụng các công cụ này trong dạy học hóa học có ý nghĩa thực tiễn, góp phần phát triển năng lực giải quyết vấn đề và sáng tạo, nâng cao hứng thú học tập của học sinh trong giai đoạn giáo dục hiện nay.</p>
<p>TỪ KHÓA</p> <p>Truyện</p> <p>Truyện tranh</p> <p>Phim hoạt hình</p> <p>Năng lực giải quyết vấn đề và sáng tạo</p> <p>Hóa học</p>	

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1. Introduction

Our country's education is in a period of fundamental and comprehensive innovation. Resolution 29-NQ/TW of the Party Central Committee (Tenure XI) oriented: "The revolution in educational methods must focus on learners, training and developing the competence to solve problems dynamically, independently and creatively right in learning at general schools" [1]. Since then, creative problem-solving competence has been identified as an important competence that needs to be formed and developed for students in high school.

Stories, comics, and cartoons are highly entertaining products. Stories are often engaging due to their content, plot, and narration. Comics are even more engaging as they combine vivid visuals with concise dialogue. Cartoons have the added advantage of integrating images, movement, and sound at a pace that enhances the conveyance of action and emotion while also being more accessible to a broader audience. If they are used to convey learning content appropriately, they will stimulate interest, positivity, and initiative and improve students' learning outcomes. In particular, creating stories, comics, and cartoons based on real-life situations will create opportunities for students to apply knowledge to solve practical problems creatively, while also contributing to meeting the interests and strengths of many students with artistic tendencies.

Several authors have studied the issue of using stories in teaching chemistry. Rebecca and Audrey [2], Erika and Kari [3], Collins et al. [4] have studied and pointed out the benefits of using short stories in teaching, proposed some measures to integrate short stories into chemistry lessons and how to evaluate the effectiveness of the proposed measures. In Vietnam, Duong [5] and Tran [6] studied the content of stories about chemistry, and Duong [7] proposed using short stories in teaching chemistry.

The use of comics and cartoons in teaching chemistry has been studied by several authors such as Oktapianti [8] who studied the design of a set of comics on thermochemistry as self-study materials for 11th-grade students and affirmed that comics can be a tool to improve the participation and teaching process of both teachers and students. Thai and Phan [9] proposed 4 principles and a 6-step process to design cartoons to support teaching Natural Science in grade 9 and initially pointed out the effectiveness of using cartoons on the formation of knowledge structures and learning interest of students.

Thus, there are few studies on using stories, comics, and cartoons in teaching chemistry. Initially, there was research on the current situation of the above problem at the Kindergarten level in a narrow range [10]. Therefore, in this study, we aim to study and evaluate the current situation of using stories, comics, and cartoons in teaching Chemistry in high schools today to answer the question: Does the use and organization of activities of creating stories, comics, and cartoons in Chemistry have practical significance in current general education?

2. Methodology

The purpose of this survey is to clarify the current situation of using stories, comics, and cartoons in teaching chemistry in high schools to have a basis for proposing some measures to use these tools in teaching to develop creative problem-solving competence for students.

The survey was conducted on 1191 students and 122 Chemistry teachers in 18 high schools in some provinces and cities in the North: Hanoi, Thai Binh, Hai Duong, Bac Ninh, Bac Giang, Hung Yen, Nam Dinh, Hai Phong, Quang Ninh, Vinh Phuc, Phu Tho, Tuyen Quang, Lao Cai.

We used quantitative research methods through survey forms for teachers and students (directly via printed forms and online via Google Forms). The number of students and teachers is relatively evenly distributed across high schools in provinces, as well as in rural and urban areas, to ensure that the data is representative. Data were collected and processed using Excel software.

The survey content for students includes their attitudes towards Chemistry, their attitudes towards stories, comics, and cartoons, and their ability to create stories, comics, and cartoons; the

level of their support for the use of stories, comics, and cartoons in teaching chemistry; and the level of expression of their creative problem-solving competence in Chemistry.

The survey content for teachers includes their perceptions of the manifestations of creative problem-solving competence of students; their teaching and assessment methods in Chemistry; and their level of use and ability in creating stories, comics, and cartoons in teaching chemistry.

3. Findings and discussion

3.1. Student survey results

- About attitude towards Chemistry:

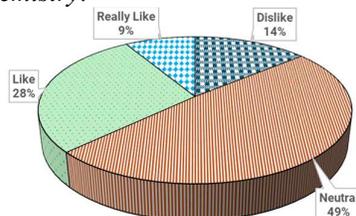


Figure 1. Students' attitudes towards Chemistry

The data in Figure 1 shows that the percentage of students who like and really like Chemistry is still low (37%). The reason is that many students think that Chemistry has a lot of difficulty in understanding and remembering knowledge (75.5%), has little connection with reality (52.2%) and the organization of teaching is not attractive (55.6%). In addition, some students also said that when learning Chemistry, they have to remember many formulas, and complex calculation problems and do not have many opportunities to practice, so they do not like this subject. Therefore, to enhance students' interest in learning Chemistry, teachers must actively connect the knowledge of the lesson with reality and use different teaching tools and forms to attract students. For that reason, using stories, comics, and cartoons with practical content or organizing students to compose and design these products will have the opportunity to meet this requirement of current teaching.

- About attitudes towards stories, comics, and cartoons:

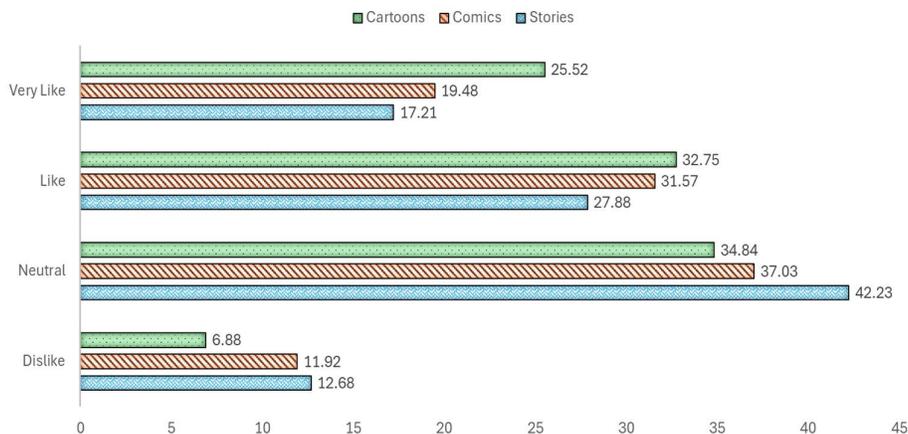


Figure 2. Students' attitudes toward stories, comics, and cartoons

The result in Figure 2 shows that many students are interested (like and really like) in reading stories (45.09%), reading comics (51.05%) and watching cartoons (58.27%), especially stories, comics and cartoons containing elements such as fiction (fictitious characters, 54.74%), reality (solving problems in practice, 49.03%), science (containing scientific knowledge, 47.61%) and

humor (45.59%). This shows the current trend of students accessing information and the factors that need to be focused on in creating stories, comics, and cartoons for students.

- About the frequency of creating stories, comics, and cartoons in studying Chemistry:

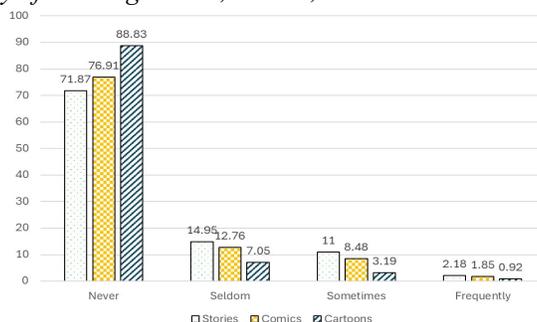


Figure 3. Frequency of students' creating stories, comics, and cartoons

The data in Figure 3 shows that most students have never participated in creating stories (71.87%), comics (76.91%), and cartoons (88.83%). This proves that these activities have not been organized much in the learning process in general and in Chemistry. Besides, some students have carried out these activities, but mainly based on their interests and strengths, not based on the learning needs of the subject or the requirements of the teacher.

- About students' ability to create stories, comics, and cartoons:

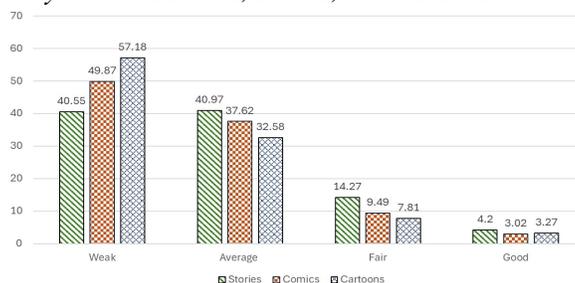


Figure 4. Students' ability to create stories, comics, and cartoons

Figure 4 shows that many students have average or higher ability in creating stories (59.44%), comics (50.13%), and cartoons (43.66%). Many students know some software tools for designing comics and cartoons such as Canva, Medibang, Ibis Paint, PaintToolSAI, Picsart, and Adobe Illustrator,... and said that they can design with the software when introduced and guided. This shows the students' information technology ability and proves that teachers can organize these activities for students in practice.

- About the level of support for the use of stories, comics, and cartoons in teaching Chemistry.

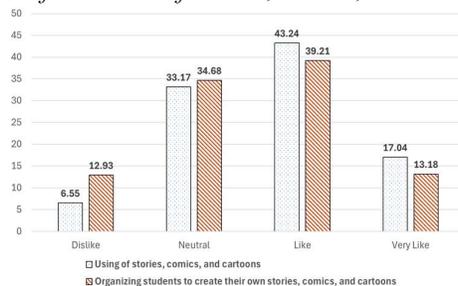


Figure 5. Students' level of support for the use of stories, comics, and cartoons

The data in Figure 5 shows that the majority of students expressed their support (like and really

like) for using stories, comics, and cartoons (60.28%) or organizing students to create their own stories, comics, and cartoons in Chemistry (52.39%). This proves that if teachers organize these activities in chemistry teaching, it can meet the needs, interests, and strengths of many students.

- About students' learning activities in Chemistry:

Table 1. Frequency of students' learning activities

Order	Activity	Frequency			
		Never	Seldom	Sometimes	Frequently
1	Propose practical situations.	27.04	33.59	33.17	6.21
2	Identify problems to be solved in practical situations.	22.92	29.3	37.87	9.91
3	Propose solutions to solve practical problems.	23.34	30.81	35.35	10.5
4	Plan and implement practical problem-solving in groups.	25.52	30.48	35.1	8.9
5	Propose new ideas in solving and presenting practical problems.	26.78	34.17	32.41	6.63
6	Collect comments and suggestions on the results of solving practical problems.	23.17	26.53	36.94	13.35
7	Evaluate the results of solving practical problems according to the set criteria.	25.27	31.99	34.01	8.73
8	Adjust the results of solving practical problems after receiving comments and evaluations.	23.43	28.46	35.1	13.01

The activities listed in Table 1 reflect the manifestations of the creative problem-solving competence of students. The survey results in Table 1 show that the implementation of the learning activities is not frequent, especially in proposing practical situations (6.21%), giving new ideas in solving and presenting practical problems (6.63%), evaluating problem-solving results according to criteria (8.73%), planning and implementing practical problem-solving in groups (8.90%). Therefore, to develop these skills, teachers need to increase the assignment of cooperative tasks to students to find practical situations related to the lesson and create based on those practical situations, and at the same time provide specific evaluation criteria for these learning tasks.

- About the level of students' learning skills:

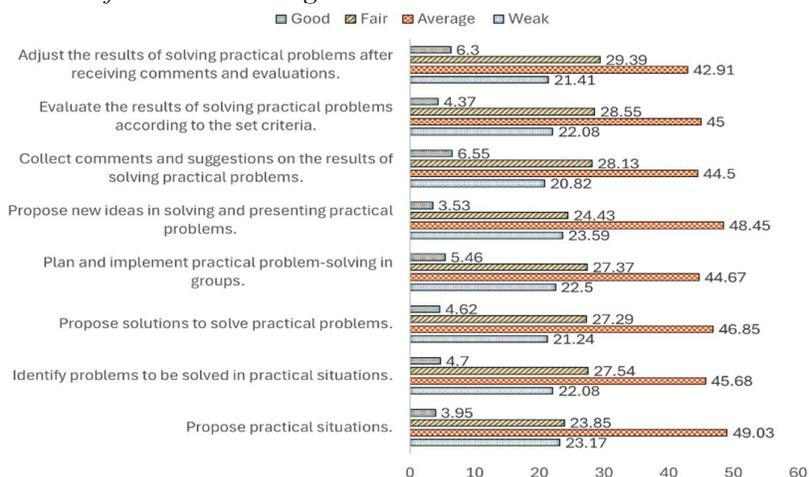


Figure 6. Level of students' learning skills

Figure 6 shows that the rate of students self-assessing their skills (corresponding to the manifestations of students' creative problem-solving competence) at the fair and good levels is not high, especially the manifestations such as proposing practical situations (27.8%), giving new

ideas in solving and presenting practical problems (27.96%). These will be the manifestations of creative problem-solving competence that teachers need to focus on developing for students during the learning process.

3.2. Survey results for teachers

- *Teachers' awareness of the manifestations of creative problem-solving competence:*

Table 2. Teachers' opinions on the manifestations of creative problem-solving competence

Order	Manifestations	Opinion			
		Disagree	Uncertain	Agree	Strongly agree
1	Propose practical situations.	1.64	3.28	68.03	27.05
2	Identify problems to be solved in practical situations.	0	1.64	63.93	34.43
3	Propose solutions to solve practical problems.	0	1.64	66.39	31.97
4	Plan and implement practical problem-solving in groups.	0.82	4.92	69.67	24.59
5	Propose new ideas in solving and presenting practical problems.	0	3.28	62.3	34.43
6	Collect comments and suggestions on the results of solving practical problems.	6.56	11.48	60.66	21.31
7	Evaluate the results of solving practical problems according to the set criteria.	3.28	8.2	65.57	22.95
8	Adjust the results of solving practical problems after receiving comments and evaluations.	3.28	4.1	68.85	23.77

The data in Table 2 shows that most teachers agree and strongly agree that the above manifestations are basic manifestations of students' creative problem-solving competence. In addition, some teachers also suggested other manifestations such as: Collecting and clarifying information related to the problem, asking questions, and arguing about problems with arguments and evidence. This shows that most teachers are aware of the manifestations of students' creative problem-solving competence in high school.

- *Some teaching methods/techniques used by teachers in teaching chemistry to develop students' creative problem-solving competence:*

Table 3. Level of use of teaching methods and techniques in chemistry teaching

Order	Teaching methods and techniques	Level			
		Never	Seldom	Sometimes	Frequently
1	Teaching in groups or pairs	0	1.64	44.26	54.1
2	Active teaching techniques	1.64	14.75	60.66	22.95
3	Problem-solving teaching	1.64	22.95	45.9	29.51
4	Project-based teaching	9.84	45.9	34.43	9.84
5	Visual methods	0	4.92	36.07	59.02
6	Research methods	0	14.75	55.74	29.51
7	Using exercises	0	1.64	14.75	83.61
8	Using exercises with practical content	0	3.28	62.3	34.43
9	Using stories, comics, or cartoons	14.75	49.18	22.95	13.11
10	Organize students to create stories, comics, or cartoons	24.59	52.46	18.03	4.92

The data in Table 3 shows that the teaching methods most frequently used by teachers in Chemistry are presentation, questions and answers, and exercises. Some methods that are also used quite frequently are teaching in groups or pairs, visual methods, and problem-solving teaching methods. The use of practical exercises and research methods is not frequent. In particular, project-based teaching methods, using stories, comics, cartoons, or organizing students to compose stories, comics, and cartoons are still rarely used, although these methods are

evaluated by teachers as effective in developing students' creative problem-solving competency. This shows that the measures to develop students' creative problem-solving competency are still not abundant and not implemented regularly. The reason is that these methods are often resource-intensive, requiring significant time and effort for design, organization, content selection, and implementation, as well as diverse student skills.

- *Some assessment methods/tools used by teachers in teaching chemistry:*

The survey result shows that the methods of student assessment that are frequently used by most teachers in chemistry teaching are question and answer (83.61%), written test (exam) (67.21%), using practical questions/exercises (54.1%), notebooks/self-study notebooks (49.18%) and assessing learning products (47.54%). Organizing students to self-assess, evaluate each other, and use assessment forms according to criteria are still not used regularly. This shows that despite some changes, assessment methods still do not adequately evaluate students' competencies, particularly creative problem-solving skills.

- *Regarding the frequency of use and teachers' ability to create stories, comics, and cartoons in chemistry teaching:*

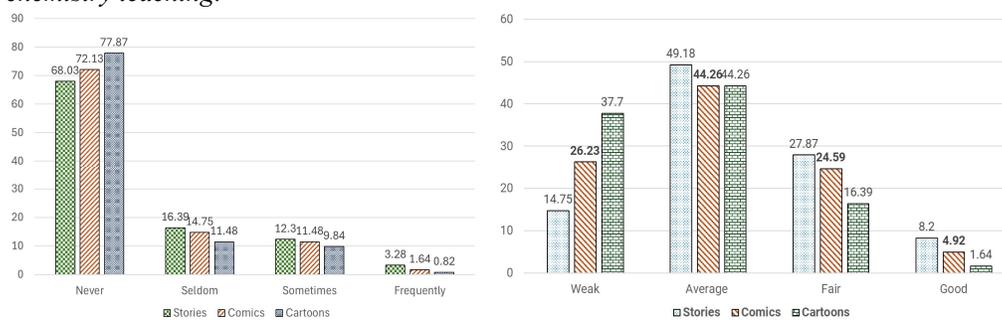


Figure 7. Frequency of use and ability to create stories, comics, and cartoons of chemistry teachers

Figure 7 shows that creating stories, comics, and cartoons is still a new task for teachers. Some teachers said that they have used these products in teaching but mainly collected them from different sources. However, many teachers said that they can create and design these products by using some computer software. This will be an advantage for using stories, comics, and cartoons in teaching chemistry in high schools.

- *About the level of support of teachers in using stories, comics, and cartoons in teaching chemistry:*

The data obtained shows that the majority of teachers support the use of stories, comics, and cartoons (77.05%) and organize students to create stories, comics, and cartoons (68.85%) in teaching chemistry. At the same time, teachers believe that stories, comics, and cartoons are suitable for introductory activities (81.97%) and application activities (86.89%). Organizing student creation of these products is most suitable for application activities (96.72%) due to time constraints.

3.3. General remarks

Through analyzing the above data, we have drawn some conclusions as follows:

- Many students are still not interested in learning Chemistry, so it is necessary to increase the practical and attractive elements of the lesson.

- Most students like stories, comics, and cartoons with elements of fiction, reality, science, and humor and support the inclusion of these products in the teaching process. Most students have not participated in creating stories, comics, and cartoons, however, many students know about design software and can create these products if requested and guided by teachers.

- The expression or skills of students' creative problem-solving competence in high schools are still limited, especially in proposing practical situations and giving creative ideas in solving and presenting practical problems. Activities to practice these skills have not been regularly

performed by students in high schools.

- Most teachers are aware of the manifestations of students' creative problem-solving competence, however, the implementation of measures to develop and design tools to assess this student's competence in chemistry teaching are not abundant and have not been done regularly.

- Most teachers support and believe that introducing stories, comics, and cartoons into chemistry teaching can contribute to developing students' ability to solve problems and solve problems, suitable for organizing teaching and learning introductory and application activities.

4. Conclusions

Through a survey of 1191 students and 122 Chemistry teachers of high schools in North Vietnam, the current situation of using stories, comics and cartoons in teaching Chemistry has been initially clarified. The results show that using stories, comics, and cartoons in lessons or organizing activities to create stories, comics and cartoons for students has practical significance. These will be good measures to increase interest in learning, meet the needs and interests of many students, and meet the requirements of teaching to develop creative problem-solving competence in general education today.

Acknowledgements

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