

Research on Innovative Education in Secondary School Physics in the New Media Environment

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Abstract – This paper presents a study of innovative education in secondary school physics in the new media environment, which has practical implications for teaching in current secondary school physics classrooms. New media, which are rapidly gaining popularity today, have become an important part of people's lives, and their use covers all age groups. Secondary school physics is a subject that is highly theoretical and requires logical thinking skills and imaginative space. Nowadays, traditional physics teaching classrooms are not enough to stimulate students' interest in exploring physics, therefore, teachers should make use of the development of multimedia for innovative education, using multimedia teaching and traditional classroom combination to show the charm of physics knowledge and realize the effective use of new media resources in secondary school physics classroom teaching. This is of far-reaching significance to the development of students' innovative thinking and practical exploration skills.

Keywords – New Media, Physics Teaching, Innovative Research, Secondary School Physics Classroom, Teaching Methods.

I. INTRODUCTION

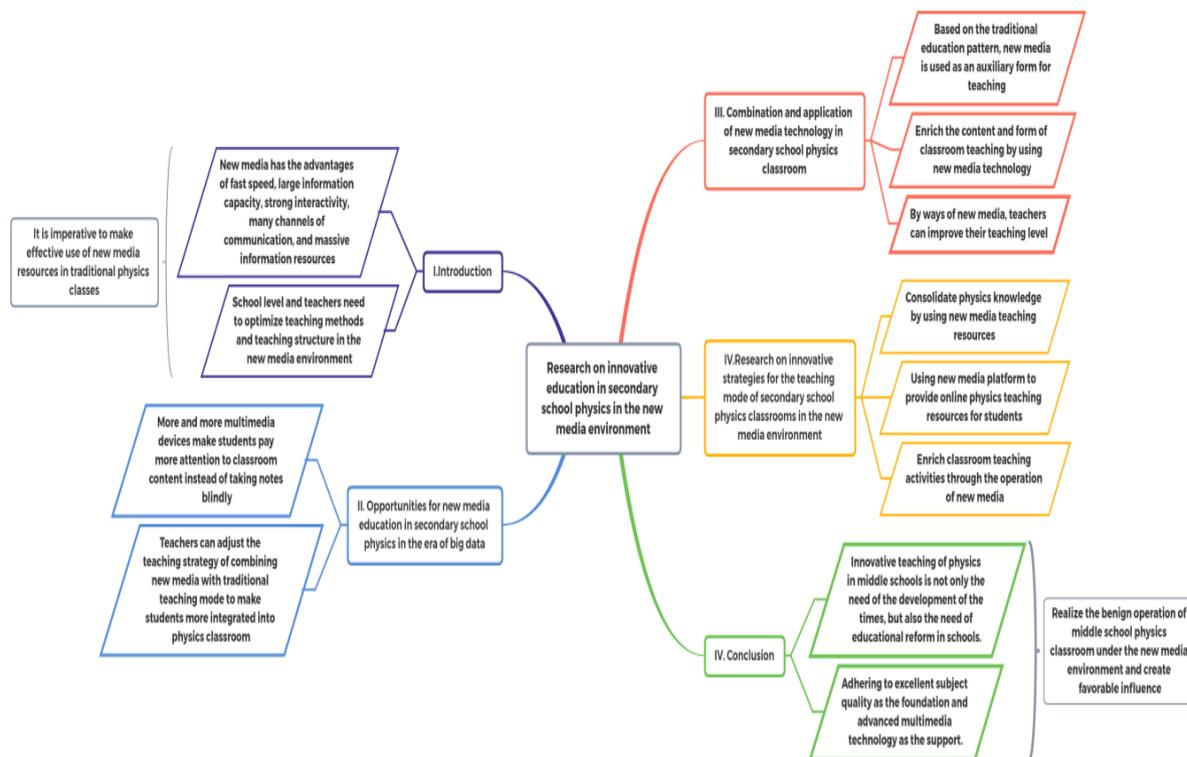


Fig. 1.

“The Internet is one of the greatest inventions of the 20th century. “As an important product of the Internet era, new media has brought great changes and innovations to all areas of society. With the advent of the Internet

age, the all-media age and the mobile learning age, it is not sufficient for teachers' work in teaching secondary school physics to rely solely on the traditional classroom teaching and the mere adherence to the transmission of book knowledge. New media have the advantages of fast speed of communication, large capacity of information carrying, real-time interactivity, a variety of communication channels and a huge amount of information resources. These advantages have a great impact on the traditional education pattern. In order to improve the efficiency of teaching and learning and enhance students' interest in learning effectively, schools and teachers need to optimize the teaching methods and teaching structures, combining teaching methods with the new media environment, so that students can better grasp physics knowledge and become an innovative person who can adapt to the rapid development of society.

II. OPPORTUNITIES FOR NEW MEDIA EDUCATION IN SECONDARY SCHOOL PHYSICS IN THE ERA OF BIG DATA

New media is a medium that uses network technology to address our entertainment needs or to keep us informed. Compared to the four traditional media in the sense of newspaper, outdoor, radio and television, new media is more convenient. The new media has a wider audience, as almost everyone is a publisher and a receiver of information. The new media is more convenient and quicker, as we can learn about national events or the frontiers of science and technology at the first time, with almost no time delay, which is more convenient and quicker compared to radio and newspapers. In addition, the new media is not controlled by length and time, so we can find out all kinds of knowledge and find out what is happening in all corners of the world. New media is also gradually being used in teaching life.

Nowadays, most junior and senior schools have adequate LED display systems, multimedia classrooms, and multifunctional meeting rooms, etc. More and more multimedia equipment is gradually replacing the board, with the help of which students do not have to bury their heads in notes, but can pay more attention to their thinking. At the end of the lesson, students can also review the key points of the lesson through the classroom. Most of the knowledge in high school physics is fragmented and abstract. The new media environment solves this problem by presenting abstract problems in a visual way with sound, pictures and videos, which greatly mobilizes students' enthusiasm and contributes significantly to the teaching effect.

New media has the advantage of being intuitive and visual. Combining traditional teaching methods with the new media environment allows students to better grasp physics knowledge, and depending on their learning outcomes, teachers adjust their teaching strategies to the new media and traditional teaching modes, making students more enthusiastic about the physics classroom and thus greatly helping develop their talents and find the right direction for themselves according to their interests ^[1]. This is the challenge of the new media environment and the opportunity to improve the secondary physics classroom.

III. COMBINATION AND APPLICATION OF NEW MEDIA TECHNOLOGY IN SECONDARY SCHOOL PHYSICS CLASSROOM

A. *Teaching Based on Traditional Education Models, with New Media as an Aid*

Nowadays, with teachers paying more and more attention to the use of modern multimedia technology, classroom teaching methods are constantly enriched; students' enthusiasm has increased; the attractiveness of

the physics classroom to students has been enhanced, making the traditional classroom of “chalk + blackboard” gradually transformed into a new classroom of “Teaching courseware + electronic information”. The traditional classroom of “chalk + blackboard” will gradually change into a new classroom of “Teaching courseware + electronic information”. The new classroom will gradually be transformed from the traditional classroom of “chalk + blackboard” to the new classroom of “Teaching courseware + electronic information” [2].

The new classroom will have a huge audience with social software and short video software, such as QQ, WeChat, Microblog, Bilibili, as well as the up-and-coming sharing platform such as Tik Tok and RED, which mainly use short videos as a means of presentation, and have firmly captured the hearts and minds of young users [3]. The physics classroom has become increasingly modern in its teaching methods, in line with the demand for innovation in teaching, and most junior and senior secondary schools are beginning to use multimedia equipment, combining with traditional teaching. Teaching in secondary school physics classrooms should focus on active learning by students and advocate a team approach to collaborative inquiry. Some students do not like to think, or are slow to understand problems, so teachers can set up learning groups, dividing those who think hard and love to explore physics knowledge into groups with those who do not, and using new media channels to create bonds for them, such as building QQ groups or WeChat groups to facilitate group discussions and encourage students to ask questions actively. The richness and breadth of the content and the creative and entertaining learning modes have made the physics classroom more enjoyable for students, these are all due to the richness of the teacher’s knowledge base and the support of powerful new media technology.

The rise of new media has been instrumental in building bridges between students and teachers outside the classroom, especially during the epidemic when many lessons can only be taught online, at which point the role of new media comes to the fore. Teachers use teaching resources on the Internet to set learning tasks for students, quizzes are issued through the Internet to test the learning effect, and the online environment also allows students to raise any areas of physics knowledge they do not understand at any time and from anywhere.

B. Using New Media Technology to Enrich the Content and Form of Classroom Teaching

Physics teachers must establish the concept of openness and inquisitiveness, and constantly absorb new technology and learn new methods to inject new vitality into their classroom teaching. In the new media environment, the combination of traditional teaching and new media is already a major trend. Nowadays, new media technologies gradually make abstract and difficult knowledge in physics textbooks vivid, visual and concrete. For example, the emergence of multimedia equipment such as projectors and electronic white boards. These increasingly sophisticated new media technologies have greatly enriched the presentation of physics knowledge, and the teaching methods in physics classrooms have become more diverse, and students’ interest in learning physics has increased. Abstract, complex and incomprehensible physics experiments in physics textbooks can be presented using multimedia, and new media can show students all the details of physics experiments to facilitate their understanding; pictures and videos are used to attract students’ interest [4]. For instance, in the study of electromagnetism, due to we can not see and touch the electric charge, electric field lines in our real life, teacher can use videos to show the experimental phenomenon in its entirety. The movement process of electric charge in the electric field can emerge from dynamic video, which would make students more easily accepted and understand memory.

C. Teachers can Improve Themselves through the New Media

In the new media environment and in the Internet era, teachers should strive to become participants in the classroom, actively motivating students in the classroom. This is the best way to give students the best possible experience of the physics classroom. The teacher should be both teacher and friend to the students, working together to complete the learning of physics knowledge. For physics education in the new media environment, teachers need to change their traditional educational philosophy and teaching methods to keep up with the times and create teaching methods that are appropriate for the Internet age.

Teachers should actively assimilate relevant subject knowledge, learn how to create various types of digital media and use a range of innovative approaches to curriculum design and teaching activities. Only teachers are always striving to improve themselves, actively use multimedia equipment and technology in teaching physics, and gradually improve their teaching skills and quality by learning how to use new media equipment, so that they can improve and professionalize themselves and make students more convinced of the knowledge they are taught.

IV. RESEARCH ON INNOVATIVE STRATEGIES FOR THE TEACHING MODE OF SECONDARY SCHOOL PHYSICS CLASSROOMS IN THE NEW MEDIA ENVIRONMENT

A. Using New Media Teaching Resources for Consolidation of Physics Knowledge

To learn from the past is to know the new. In the process of learning physics knowledge, it is of great significance to consolidate the physics knowledge students have learned in the past from time to time. Therefore, it is important that students pay attention to the importance of revision when studying the subject of physics, and that teachers make sure that students review and consolidate their knowledge from time to time. Teachers in the school classroom need to focus on the efficiency of students' learning of new knowledge and are unable to spend too long consolidating previous knowledge. At this point, new media platforms can be used to issue quizzes so that students can easily refresh their knowledge and strengthen their secondary digestion and absorption of physics knowledge.

Teachers can also use information media technology to provide real-time quizzes and feedback on students' learning, so that they can make adjustments to their own teaching programmes as appropriate to their students' reception of knowledge, so that they can continue to improve their teaching skills and adapt to the needs of the times. Teachers can select typical exercises and post them on a platform such as Learning Connect, where students can take time-limited quizzes on a regular basis to develop the ability to apply their knowledge to physics problems and to think logically. At the same time, teachers can use the new media platform to check the effectiveness of students' work online and collate the types of questions that students often get wrong, and can create a special collection of questions on the new media platform to bring together questions that students usually get wrong, so that students can review their weaknesses in physics in a timely manner^[5]. Teachers can issue real-time check-ins to test students' learning and learning attitudes.

B. Using New Media Platforms to Provide Online Physics Teaching Resources for Students

New media technology is an extension and innovation of traditional teaching. When using new media technology for teaching, teachers cannot discard traditional board books, and multimedia teaching resources can

be combined with traditional teaching modes to produce good teaching effects. For example, when teaching physics - the law of convex lens imaging, teachers can use video or teaching courseware to show students the process of convex lens imaging. In addition to this, they can also deepen students' understanding of convex lenses by using mnemonics, and make interesting videos to help students remember the law of convex lens imaging.

Tik Tok is very popular nowadays, and apart from entertainment videos, many people also choose to post videos about learning on the Tik Tok. This kind of video is not only simple and easy to make, but also impresses learners and make those audience gain knowledge while being entertained. Therefore, teachers can use short video apps such as Jitterbug to generalize physics knowledge in a light-hearted and enjoyable video. At the same time, students can also search for physics-related courses on teaching platforms such as “China University Moot” and extend their knowledge on their own. New media platforms are an important channel for daily learning and interaction. For example, during the epidemic, when school was not in session, new media platforms became indispensable to our ‘cloud classroom’.

In addition to this, teachers can also use WeChat public platforms and WeChat groups to publish content. WeChat can deliver information anytime, anywhere, making it easy for students to learn about physics directly and breaking the boundaries of time and space. Students can use the online function of WeChat to view new news and physics knowledge from teachers on WeChat anytime and anywhere, making it easy, fast and efficient to ‘recharge’ themselves by viewing the content in pieces. Moreover, WeChat is a very diversified form of communication. The WeChat platform is rich in forms of communication, with the freedom to publish pictures, videos, voice and H5 content, etc. Teachers can make the key points of the content in the form of WeChat tweets for students to study and review on their own. The diversity of the WeChat platform can stimulate secondary school students' interest in learning physics. WeChat is extremely interactive. WeChat also allows for real-time interaction between teachers and students by allowing students to leave background messages and click on “Watch”, which brings teachers and students closer together and dilutes their identity boundaries.

C. Running through New Media to Enrich Classroom Teaching Activities

In traditional physics classroom teaching, teachers generally teach students according to book knowledge at a glance, and such teaching methods in the past physics classroom occupy the main position. Students listen to the teacher's explanation of textbook knowledge without actually seeing the process of various physical phenomena, and they can not accurately understand the physics knowledge taught by the teacher, and may even produce an aversion to learning, especially for secondary school physics this is especially true for abstract subjects like secondary school physics. In the new media environment, novel teaching modes and strategies allow students to have a deeper understanding and memory of physics knowledge, physical phenomena and physical experimental processes. New media teaching can provide a rich classroom model, and many physics points can also be demonstrated and explained through dynamic videos and teaching courseware. By this means students will also be more easily integrated into the physics classroom^[6].

D. Balancing the Relationship between New Media and Classroom

In the new media environment, the most important thing is to balance the relationship between the new media and the classroom. Only by clarifying this point can the classroom effect be more dynamic. Physics is a subject

based on experiments. Physics without experiments is just empty talk on paper. As far as high school physics is concerned, high school physics is an experimental subject with high precision, strong abstraction and mathematical quantification. The basis of understanding physical concepts and laws is to observe and experiment. Therefore, it is difficult to achieve the ideal teaching effect if we only rely on the knowledge instilled in the classroom. It is necessary to give full play to students' autonomous learning ability, guide students to recognize physical laws themselves, and let them learn to sum up laws themselves [7]. With the arrival of the new media era, autonomous teaching is possible because of its rich resources, diverse tools and virtual environment.

Of course, there are some links in the teaching process that deserve every physics teacher's attention. First of all, it is necessary to determine whether the autonomous teaching mode is applicable according to the teaching content. As far as physics teaching is concerned, there are both pure theoretical teaching and experimental teaching. Teachers should combine theoretical teaching with experimental teaching, and students should carry out hands-on practice in the experimental process. After the experiment, teachers can let students sum up the experimental rules independently through experimental data, and use teaching courseware to consolidate their knowledge. Then, teachers and students discuss the details and conclusions of the experiment together, and carry out in-class testing in time. This is the combination of new media and classroom.

V. CONCLUSION

In summary, the use of new media is a major trend in the current physics teaching classroom. Innovative teaching in secondary school physics classes is both a need of the times and a need for schools to carry out educational reform. Physics is a very important subject, not just in terms of formulas and Newton's second law, but as a 'technological' subject that needs to keep up with the trends of the times. Unlike languages, where you can travel from modern times to ancient times and immerse yourself in the beautiful words of your ancestors, physics needs to be at the forefront of the times and to drive the development of the whole era. Teachers should not only know what is in the physics textbook, but should also keep abreast of current events and understand the extent to which physics is being used and developed in the present day. If they are only teaching what is in the books, they are overly rigid in physics. High school physics teachers should therefore keep up with the trends of the times and adapt to the 'little surprises' that this new era brings us. In the meantime, teachers should have to adhere to the fundamentals of strong subject knowledge, be supported by advanced multimedia technology in the new media teaching environment, promoting a high degree of integration of teaching content and multimedia technology in the new media environment actively. This is an innovation for the physics classroom and a test and opportunity for physics teachers in the new media environment.

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