Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus

How chinese students learn mathematics during the coronavirus pandemic

Tommy Tanu Wijaya.
Guangxi Normal University (China).
Tanuwijayat@gmail.com

RESUMEN.
La pandemia de Covid-19 se ha convertido en un problema mundial hoy día. La pandemia ha afectado a muchos sectores esenciales, incluido el sector educativo. Los estudiantes no pueden ir a la escuela para estudiar y se impone un distanciamiento social al quedarse en casa. Lo que hizo el gobierno para que los estudiantes continuaran estudiando en casa fue desarrollar medios de aprendizaje a distancia. En esta investigación, conoceremos más sobre cómo los estudiantes en China aprenden matemáticas en casa y qué actitud presentan ante el aprendizaje a distancia a través de Vídeo e-learning. Este estudio empleará un método de investigación cualitativa y cuantitativa. Los investigadores entregaron unos cuestionarios a 408 estudiantes en la provincia de Guangxi, China. También realizaron entrevistas a los estudiantes y a sus padres para conocer las ventajas y desventajas de usar vídeos para el aprendizaje durante esta pandemia de la Covid-19. El resultado de la investigación muestra que hay una buena actitud de aprendizaje de los estudiantes hacia esta metodología. Los estudiantes destacan que el aprendizaje a través de Vídeos e-learning es muy interesante y además efectivo, ya que pudieron entender perfectamente el concepto que se quería transmitir.

PALABRAS CLAVE.
Covid-19, software de matemáticas dinámicas Hawgent, enseñanza y aprendizaje, Vídeos e-learning.

ABSTRACT.
The Covid-19 pandemic has become a world problem now. The pandemic has affeected a lot of core sectors including the education sector. Students are not able to go to school to study and have to do a social distancing by staying at home. What the government did so that students will still be able to study at home is by developing a long-distance learning media. In this research, we will get to know more about how students in China learn mathematics at home and their learning attitude towards the learning video. This research will use a qualitative and quantitative research method. The researchers gave out questionnaires to 408 students in Guangxi province, China. The researchers also did an interview on the parents and students to know the advantages and disadvantages of using the learning video during this covid-19 pandemic. The research result shows that there is a good student learning attidude towards the learning video. Students feel that the learning video is very interesting yet effective as they were able to understand the concept taught.

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

KEY WORDS. Covid-19, Hawgent dynamic mathematics software, Teaching and Learning, Video Learning

1. Introduction.

The 2019 novel coronavirus (Covid-19) was first identified by the Chinese Disease Control and Prevention center from a patients' throat swab in Wuhan, Hubei province, China on 7th January 2020 (Ashokka et al., 2020). This infection started has to spread to many countries around the world and on 30th January, the WHO declared the coronavirus as a 'Public Health Emergency of International Concern'. This is because the average incubation period is 5-6 days with the longest incubation period of 14 days. A patient who got infected with the COVID-19 can experience pneumonia, acute breathing syndrom, kidney failure and even death (Cao et al., 2020). With this in mind, the government ask the citizens to do social and physical distancing (Murphy, 2020).

The coronavirus pandemic has affected a lot of core sectors such as the economy, education and other sectors to be paralyzed. People can't go to office to work and are required to stay at home. A lot of restaurants are also closed for the time being. In the education sector, students from primary school to university students were unable to go to school to study (Wijaya, Ying, & Suan, 2020). All of these actions were done to prevent and minimize the spread of coronavirus so that it won't get worse.

Now, most of the countries around the world are fighting against the coronavirus. Students from primary school up to high school were unable to go to school and are required to do social distancing but the teaching and learning activity still need to go on. Researchers all around the world made an effective learning media during this pandemic period (Kerres, 2020; Peters et al., 2020). Students in all over China were required to study independently at home. There were also learning media that is used in the online or video learning process. The Chinese government did their best so that student's learning activity are not stopped during the pandemic. So even if the students are at home, the learning process can still be done by using technology-based applications such as a learning video. Other than that, teachers were still able to monitor the students and give instructions and homework by using WeChat and to communicate with their parents so that students are doing their learning activity correctly at home. Teachers also work from home by coordinating with the parents using video call or pictures of the students.

Generally, technology in the education field can be used as an effective learning media to improve the students' mathematics ability (Al-Mashaqbeh, 2016; Chotimah, Bernard, & Wulandari, 2018; Suan, Ying, & Wijaya, 2020; Wijaya, Purnama, & Tanuwijaya, 2020). Technology can also make students be more interested and enthusiast to learn mathematics compared to the traditional teaching method (Miguel-Revilla, Martínez-Ferreira, & Sánchez-Agustí, 2020; Mushipe & Ogbonnaya, 2019). This learning condition can potentially make student be more active and self-confident when learning a certain topic (Rohaeti, Bernard, & Primandhika, 2019). Based on the current problems, an ICT based learning media can help teachers in guiding students to find the basic concept and the core of learning (Badraeni et

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

al., 2020; Cunhua, Ying, Qunzhuang, & Wijaya, 2019). This kind of activity can help improve the students' mathematics ability.

Technology that is growing rapidly which can be used as an opportunity to carry out the distance learning (Oner, 2020; Redmond & Lock, 2019). The Chinese government were able to seize this opportunity to carry out the distance learning (Peters et al., 2020; Zhu & Liu, 2020). There is also various research that proved that a technology-based learning media can improve the students' learning ability and achievement (Chatmaneerungcharoen, 2019; Hernawati & Jailani, 2019; Sukaesih, Ridlo, & Saptono, 2019).

Hawgent dynamic mathematics software is a mathematics software from Guangzhou, China. It is designed according to the needs of practitioner and academician in the education field (figure 1). Hawgent have a lot of simple and dynamic features that can be easily operated according to the teachers' needs. In the education field, Hawgent can be use to explain the concept of calculus, algebra, probability, velocity, geometry and etc (Wijaya, Ying, & Purnama, 2020a).

Figure 1. Hawgent Dynamic Mathematics Software.

The core team members have stared the research and development of a dynamic mathematics software since 1998. In September 2016, Hawgent Mathematics Technology Center released its latest generation of Hawgent dynamic mathematics software. Compared with the familiar drawing board and other dynamic mathematics software, Hawgent has innovated various aspects such as flexibility, convenient operation, powerful teaching, rich curriculum resources and etc (Cunhua et al., 2019). Hawgent dynamic mathematics and other information technologies have emerged in response to the current needs and have become a solution in improving the traditional teaching. This is because Hawgent can encourage the students to think deeper into something and also it can stimulate the students learning desire.

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

Hawgent dynamic mathematics software has enabled students to master the basic knowledge and develop their ability (Wijaya, Ying, & Purnama, 2020b). At the same time, it enables the development of mathematics core literacy disciplines which are the process of abstraction and definition of the monotonic function of the development of mathematical abstract literacy, the definition of the analogous minus function to obtain the definition of increasing functions, and the development of logic from special functions to general functions Reasoning literacy; develop mathematical literacy with a process that defines the monotonic of a function.
In this research, we will show how students in china learn mathematics during the coronavirus pandemic. We will also carry out an investigation on the students' attitude towards Hawgent dynamic mathematics software's learning video.

2. Method.

This research will use the qualitative and quantitative research method so that we will be able to know how students in china study during the coronavirus pandemic and to also know the students' attitude towards Hawgent dynamic mathematics software's learning video. Lastly, researchers will interview a few students to know their opinion towards Hawgent dynamic mathematics software's learning video. The data analysis will be based on the respondent's percentage on each questionnaire item. The percentage interpretation will be shown in table 1.

Table 1. Percentage Interpretation of students' attitude towards online learning using Hawgent.

Percentage	Interpretation
0 < x < 25	Very Bad
26 < x < 50	bad
51 < x < 75	Good
76 < x < 100	Very Good

A questionnaire will be use as an instrument in this research. The questionnaire that will be use can be seen in table 2. The questionnaires are given online and the result will be processed using Microsoft excel and SPSS v21.0 to know the students' attitude towards Hawgent dynamic mathematics software's learning video.
The questionnaires were originally written in English which are then translated into Chinese language. The translation of the questionnaires was done by a native Chinese with a degree in translation. The translator is fluent in both English and Chinese and also have an inclusive knowledge on education from the experience of being a lecturer in China. The questionnaire is then reviewed in 3 stages. Firstly, the questionnaires draft was given to 5 native Chinese with a mathematics education background and a good English skill. Some of these reviewers are Guangxi Normal University lecturers. Base of the first review, the questionnaire will then be reviewed. Secondly, 10 teachers will answer the questionnaire as a trial. After compiling the result, researchers will ask for some inputs from the respondents to recheck the translations on some statements.

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

Table 2. Questionnaire on the students' attitude towards Hawgent dynamic mathematics software.

No	Statement	Answer			
		Very agree	Agree	Disagree	Very Disagree
1	I really like studying using Hawgent dynamic mathematics software.				
2	Hawgent dynamic mathematics software video is very interesting.				
3	Hawgent mathematics software videos are easy to understand.				
4	I enjoyed learning using Hawgent dynamic mathematics software videos compared to being in class.				
5	During this pandemic, I enjoy playing more than learning.				
6	I will always anticipate the newest video from Hawgent dynamic mathematics software.				
7	Now I enjoy learning mathematics.				
8	I don't enjoy learning using Hawgent dynamic mathematics software.				
9	In my opinion, learning using Hawgent dynamic mathematics software video is very hard.				
10	I enjoyed hearing the teacher's explanation rather than watching Hawgent dynamic mathematics software videos.				
11	Hawgent dynamic mathematics software helped me understand the hard-basic concept.				
12	If I don't understand, I will re-watch the Hawgent dynamic mathematics software videos.				

Finally, the questionnaire will be given to another professional native Chinese that has an experience in translating questionnaires. When the final Chinese version matches the English version, it is ready to be given out for research purposes.

Table 3. Students' background information.

Age (mean)	12.5 years male students (SD=0.95)
	14.3 years female student (SD=0.87)
gender	22.3 % male students
	77.7% female students
Grade level	47.05% elementary school
	52.94% junior high school
Relation with family	91.18% Good
	8.82% not really good
Homestay	48.77% In a city
	51.13 % In a village

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

There is a total of 408 students from Guangxi province that participated this research. There are 91 male students with an average age of 12.5 years old and 317 female students with an average age of 14.3 years old. The percentage of male and female students is 22.3% and 77.7% respectively.

From a total of 408 students, 47.05% of them are from elementary school and 52.94% are from junior high school. From 192 elementary school students, 11.4% of them are male and 88.6% of them are female. From 216 junior high school students, 14.81% of them are male and 85.19% are female.

The students' family relationship, 91.18% of them stated that they have a good relationship with their family while 8.82% does not. We can also see that there are 48.77% of the students from the urban area while 51.23% of the students are from rural areas.

3. Results.

Table 4. Descriptive data on students' attitude towards online learning.

Item number	Type	Strongly agree	Agree	Disagree	Strongly disagree	Average of each item
1	Positive	288	117	3	0	
		70.59%	28.68%	0.74%	0.00%	92.50%
		1	2	3	4	3.70
2	Positive	301	107	0	0	
		73.77%	26.23%	0.00%	0.00%	93.43%
		1	2	3	4	3.74
3	Positive	299	108	1	0	
		73.28%	26.47%	0.25%	0.00%	93.24%
		1	2	3	4	3.73
4	Positive	281	122	5	0	
		68.87%	29.90%	1.23%	0.00%	91.89%
		4	3	2	1	3.68
5	Positive	271	137	0	0	
		66.42%	33.58%	0.00%	0.00%	91.58%
		4	3	2	1	3.66
6	Positive	312	94	2	0	
		76.47%	23.04%	0.49%	0.00%	93.92%
		1	2	3	4	3.76
7	Positive	333	72	3	0	
		81.62%	17.65%	0.74%	0.00%	95.21%
		4	3	2	1	3.81
8	Negative	0	0	80	328	
		0.00%	0.00%	19.61%	80.39%	95.09%
		1	2	3	4	3.80
9	Negative	0	2	68	338	
		0.00%	0.49%	16.67%	82.84%	95.58%
		4	3	2	1	3.82
10	Negative	0	6	107	295	
		0.00%	1.47%	26.23%	72.30%	92.69%
		4	3	2	1	3.71

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

11	Positive	306	97	5	0	
		75.00%	23.77%	1.23%	0.00%	93.43%
		4	3	2	1	3.74
12	Positive	342	57	9	0	
		83.82%	13.97%	2.21%	0.00%	95.39%
		1	2	3	4	3.82
Total average						93.66%

According to table 4, no one answered disagree and strongly disagree on the statements given and based on the result, the average percentage from the respondents were 93.66%. This data shows that almost all of the students from elementary and junior high school students enjoyed learning using Hawgent dynamic mathematics software videos and they do not feel that video learning during the coronavirus pandemic is boring. There were a few researches that shows that a technology-based learning media can attract the students' attention and improve their learning ability and outcome (Bernard & Chotimah, 2018; Mushipe & Ogbonnaya, 2019; Tossavainen & Faarinen, 2019).

Figure 2. Hawgent dynamic mathematics software's learning video icon.

The Hawgent's learning video can be access on WeChat. Every day, professor Tang and students from Guangxi Normal University will regularly update new topics for elementary, junior high school and senior high school students. The video learning icon on WeChat can be seen in figure 2. Xiao fang (figure 3) are the virtual teachers on Hawgent dynamic mathematics software. With an interesting and cute way of teaching makes the students to understand the topic taught better.

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

Figure 3. Xiao fang, Hawgent's virtual teachers.

4. Discussion.

When the students are learning using Hawgent dynamic mathematics software videos, they do not find it difficult to understand the topic given in the video. This is because Hawgent dynamic mathematics software's learning video uses the problem-based learning approach. The learning videos discuss the problems faced in our daily life using mathematics. One of the learning videos can be seen in figure 4 which discusses on where is the shortest way for the roman general from point A to point B, the river. This kind of problem can be solved using the triangle concept. This way, it will catch students' attention and makes the topic easier to be understood. In the end of the video, the students will to learn the basic concept and guide the students to sum up the basic concept of a certain topic.

Figure 4. Hawgent dynamic mathematics software's learning video example.

Researchers stated that the optimal duration for a learning video is 5-10 minutes (Daniel, 2020). This is because students will find it boring and hard to understand if the video is too long. Therefore, the Hawgent dynamic mathematics software's learning video are made within 5-10 minutes so that students will not find it boring and are interested to see the next videos. The learning video are summarized so that it will focus on discussing a basic concept of a certain topic because the learning process need to focus the topic's basic concept (Khotimah,

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

Yuwono, Rahardjo, Universitas, & Malang, 2016; Nizarwati, Hartono, & Aisyah, 2013). This way, when the teacher changes the style of the problem or the level of difficulty, students will not have a difficult time in solving the problem. The flow of Hawgent's learning video using the problem-based learning method can be seen in table 5.

Table 5. The flow of Hawgent dynamic mathematics software's learning video.

No	Step	Explanations
1	Orientation of the students towards the problem	Hawgent dynamic mathematics software's learning video will discuss problems related to our daily life.
2	Organize the students	Hawgent's learning video will guide the students to know information in full detail.
3	Guide individual investigation	Hawgent's learning video will guide students to solve current problems.
4	Developing the work result	Hawgent dynamic mathematics software's learning video will help students to solve existing problems on their own.
5	Analyze and evaluate problem solving process	Hawgent's learning video will help students to make the conclusion.

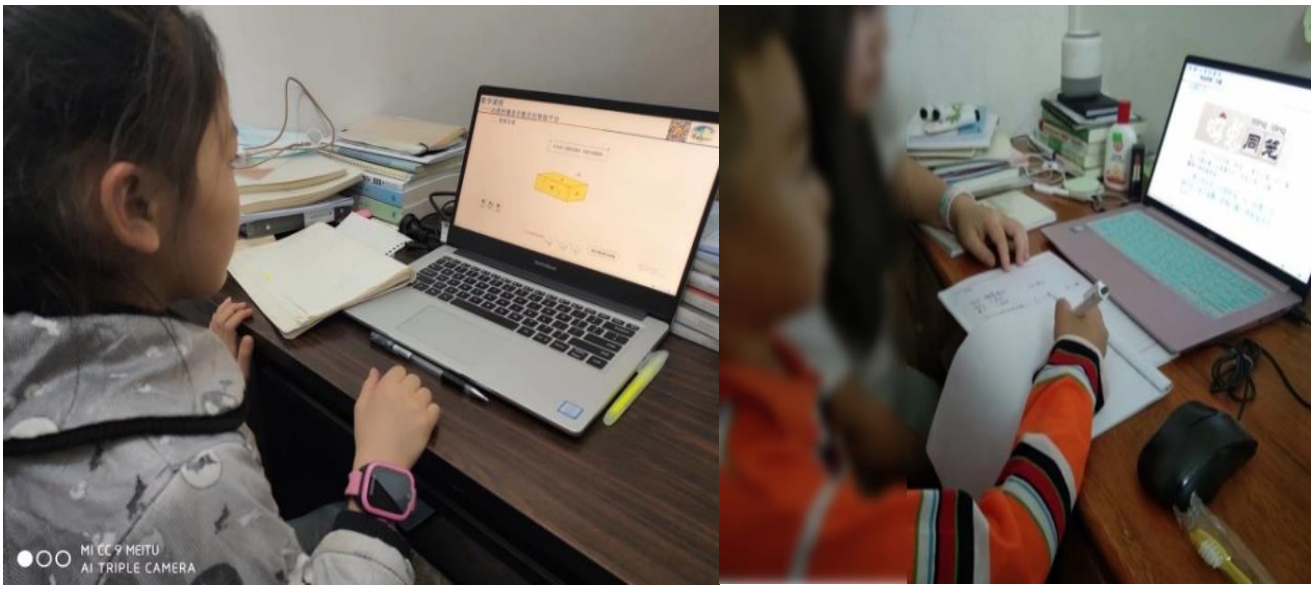
With using a problem-based learning method, students will be able to easily understand the topic given. This is also in line with the research done that stated that the problem-based learning method can improve the students' learning outcome and make it easy for students to understand the topic given by the teacher (Khatimah & Sugiman, 2019). Hence, researchers include a problem-based learning method into the video in hope that students will easily understand the problem in their daily life.

Problem solving is an important bridge between students and the actual situation in the process of mathematics learning (Fachrudin et al., 2019; Hutajulu, Wijaya, & Hidayat, 2019; Yuliani, Fuad, & Ekawati, 2019). Practical problems are complex, changeable and various. Only by constantly learning and accumulating mathematical problems that's when students can use mathematics to solve various problems. By solving mathematical problems, students will be able to learn how to think and how to transform their static knowledge and skills into dynamic solutions. In the process of solving problems, students' perseverance and curiosity are trained so that they will be more confident when facing activities both inside and outside class (Tezer & Karasel, 2010). In addition, mathematics learning and problem solving are also interrelated and interdependent wherein mathematics learning can improve students' problem-solving ability. Mathematics learning is a process of knowledge transfer. The application of mathematics skills is to improve students' decision-making ability in different situations. Also, mathematical problem skill is important to teach mathematical concepts and procedures. Mathematics learning itself is boring so if it is a problem-based, it can stimulate the students' interest in learning mathematics (Sofyadin, 2019). A mathematics problem-based activity is an important way for students to learn mathematics deeper and think deeper (Brezovszky et al., 2019).

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

Problem solving is a transition process from initial to target state, which requires a series of complex cognitive psychological activities (Kay & Kletskin, 2012). From problem identification to representation then to solution, all of which need problem-solving ability. Problem solving ability, as an important ability to improve students' mathematical thinking and deepen their mathematical consciousness, must be developed through mathematical problem decision. The process of mathematics learning is inseparable from problem decision. Efficient problem decision can not only improve the learning efficiency, but also facilitate the process of "compressing and decompressing" the activities of mathematics programs. To a certain extent, mathematical problem decision can maximize the use of mathematical methods and ideas, and pave the way for solving mathematical problems. Learning mathematics problem decision can help students form the good habit of persistence and curiosity, promote the rigorous way of thinking of students, and be more confident when facing the new environment. It is these qualities that will serve them better outside the mathematics classroom. From this we can see that the importance of mathematical problem decision. Mathematical problem decision is a process of accepting problems as a challenge to solve problems. Through mathematical problem decision, students can observe and examine life from the perspective of mathematics, and use mathematical thinking to face various phenomena in life. In this study, mathematical problem decision includes four steps: they are understanding the problem, designing a plan, implementing the plan, and then looking back (Arum, Kusmayadi, & Pramudya, 2018; Fitri & Prahmana, 2019).

In figure 5, we can see the learning process using Hawgent dynamic mathematics software's learning video that can be done by the students on their own by making their own virtual account on WeChat then play the learning video. Parents can also supervise and help when they are facing difficulties during the learning process. Students looked very serious and enthusiast when learning using Hawgent dynamic mathematics software's videos.



Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

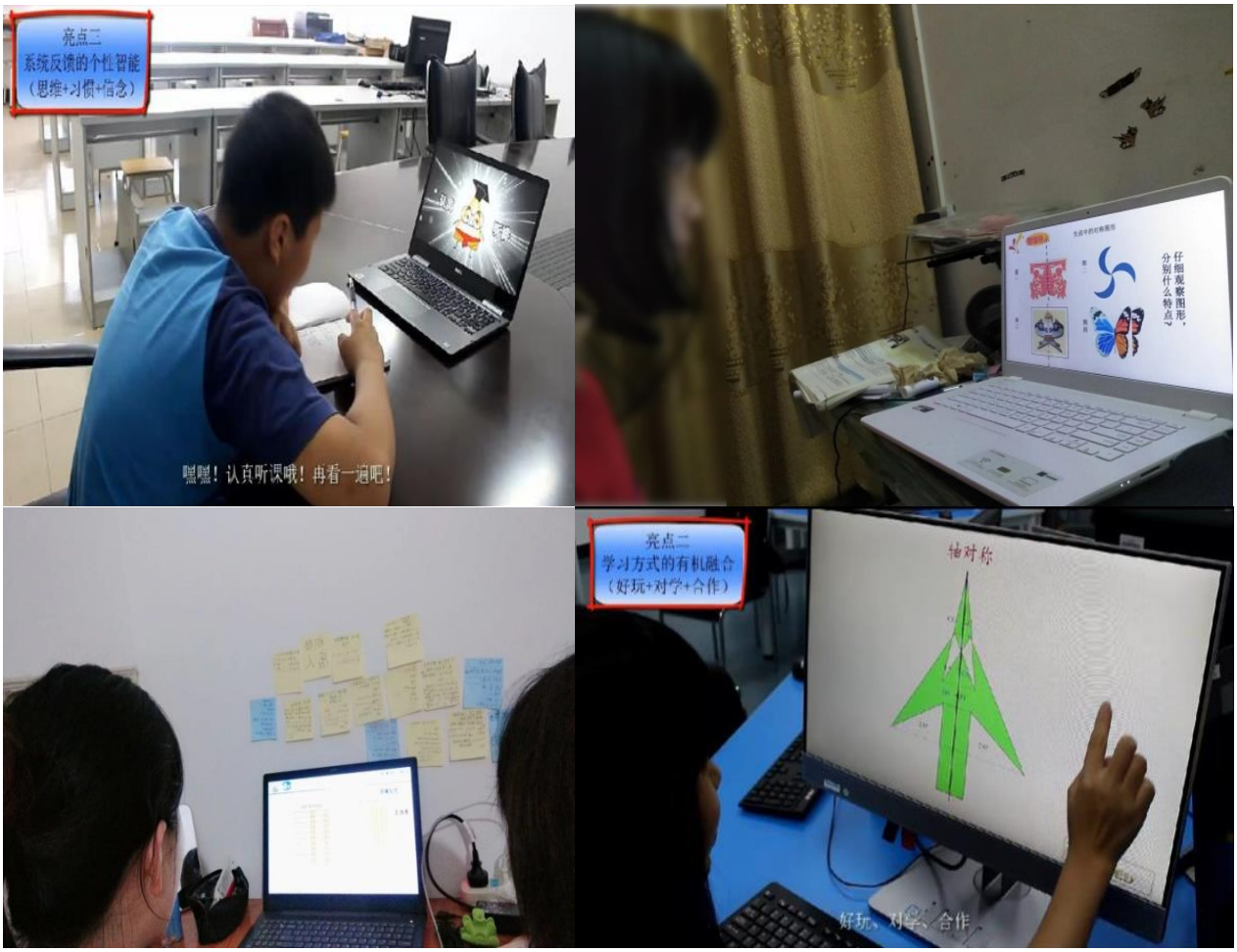


Figure 5. Students paying attention to Hawgent dynamic mathematics software's learning video.

Actually, learning from home during the coronavirus pandemic won't be a problem if the students are able to work together which means that they will diligently and independently study on their own using the learning video or other existing technology-based application. With this kind of long-distance learning system, the students will be able to access the application or learning video whenever they want and study independently. So during this coronavirus pandemic, the learning medium is not a problem but there is a need for teachers, parents and students to work together so that the learning process will be effective and motivate them to keep on learning.

Finally, researchers did an interview to some students and parents to know their opinion on the Hawgent dynamic mathematics software's learning video that is used during this coronavirus pandemic as a media for students so that they still can learn despite of not being able to go to school. The interview result also serves as an evaluation towards the learning media to make a better learning media in the future. The interview result can be seen in table 6. The learning video receives a good response from both the parents and students. Some students stated that they enjoyed learning using a video rather than going to class. This

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

could be because sometimes the class can be very noisy and students are not able to concentrate properly on the topic taught by the teacher. Students also stated that with video learning, they can arrange their own time on when to study.

Table 6. student and parents responses about video learning

Student	**Response**
S1	Hawgent dynamic mathematics software's learning video is very interesting.
S2	I will always wait for the newest Hawgent's learning video.
S3	Hawgent's learning video can help me understand the basic concept of mathematics.
S4	Hawgent's learning video helped me to study at home during the pandemic.
S5	If possible, the learning video can be made more challenging.
S6	I feel happy to study using a learning video.
S7	Hawgent's learning video can be made into a longer duration.
S8	My parents are happy that I can study using the learning video on my own.
Parents	**Response**
P1	Even though not going to school, Hawgent's learning video helped my child to study.
P2	My child really enjoyed learning using the Hawgent's learning video.
P3	I admit that the learning video is very interesting.
P4	Not only that the learning video is easy to understand but its also has a lot of interesting contents.

The disadvantage of using a learning video during this coronavirus pandemic that parents stated was they need to give full attention on their child when using learning video. This is because there will be times wherein students are finish watching the learning video, they will use the laptop or handphone to play games.

Some suggestions that were given was for researchers to develop the Hawgent dynamic mathematics software's learning video in different languages. This way, the learning video can be access by students all around the world to help the learning process in other countries.

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

6. Conclusion.

The coronavirus pandemic did not become a barrier for students in China to keep studying even though they are not able to go to school. They can independently study in their respective homes with the help of a learning video. Based on the results the average percentage from the students were 93.66%. Hawgent dynamic mathematics software's learning video is proved to have a positive impact on the students' learning attitude. With the learning video, students can easily understand the basic concept and are enthusiast to learn other mathematics concept. Based on the interview result with the parents and students, the learning video got a positive response as a learning media using the coronavirus pandemic.

Hopefully this research can serve as a useful information for other countries that wanted to use video learning during this COVID-19 pandemic so that the teaching-learning process still can be implemented even though students are not going to school.

References.

- Al-Mashaqbeh, I. F. (2016). IPad in elementary school math learning setting. *International Journal of Emerging Technologies in Learning*, *11*(2), 48–52. https://doi.org/10.3991/ijet.v11i02.5053
- Arum, D. P., Kusmayadi, T. A., & Pramudya, I. (2018). Students' difficulties in probabilistic problem-solving. *Journal of Physics: Conference Series*, *983*(1). https://doi.org/10.1088/1742-6596/983/1/012098
- Ashokka, B., Ong, S. Y., Tay, K. H., Hooi, N., Loh, W., Gee, F., & Samarasekera, D. D. (2020). Coordinated responses of academic medical centres to pandemics : Sustaining medical education during COVID-19 Coordinated responses of academic medical centres to pandemics : Sustaining medical education during COVID-19. *Medical Teacher*, *0*(0), 1–10. https://doi.org/10.1080/0142159X.2020.1757634
- Badraeni, N., Pamungkas, R. A., Hidayat, W., Rohaeti, E. E., Wijaya, T. T., Sudirman, J. J., & Barat, J. (2020). *Analisis kesulitan siswa berdasarkan kemampuan pemahaman matematik dalam mengerjakan soal pada materi bangun ruang sisi datar*. *04*(01), 247–253.
- Bernard, M., & Chotimah, S. (2018). Improve student mathematical reasoning ability with open-ended approach using VBA for powerpoint. *AIP Conference Proceedings*, *2014*(September). https://doi.org/10.1063/1.5054417
- Brezovszky, B., McMullen, J., Veermans, K., Hannula-Sormunen, M. M., Rodríguez-Aflecht, G., Pongsakdi, N., … Lehtinen, E. (2019). Effects of a mathematics game-based learning environment on primary school students' adaptive number knowledge. *Computers and Education*, *128*(August 2018), 63–74. https://doi.org/10.1016/j.compedu.2018.09.011
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, *287*(March), 112934. https://doi.org/10.1016/j.psychres.2020.112934
- Chatmaneerungcharoen, S. (2019). Improving Thai Science Teachers' TPACK through an Innovative Continuing Professional Development Program. *Journal of Physics: Conference Series*, *1340*(1). https://doi.org/10.1088/1742-6596/1340/1/012017

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

- Chotimah, S., Bernard, M., & Wulandari, S. M. (2018). Contextual approach using VBA learning media to improve students' mathematical displacement and disposition ability. *Journal of Physics: Conference Series*, *948*(1). https://doi.org/10.1088/1742-6596/948/1/012025
- Cunhua, L., Ying, Z., Qunzhuang, O., & Wijaya, T. T. (2019). MATHEMATICS COURSE DESIGN BASED ON SIX QUESTIONS COGNITIVE THEORY USING HAWGENT DYNAMIC MATHEMATIC. *Journal On Education*, *02*(01), 36–44.
- Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, (0123456789). https://doi.org/10.1007/s11125-020-09464-3
- Fachrudin, A. D., Ekawati, R., Kohar, A. W., Widadah, S., Kusumawati, I. B., & Setianingsih, R. (2019). Ancient China history-based task to support students' geometrical reasoning and mathematical literacy in learning Pythagoras. *Journal of Physics: Conference Series*, *1417*(1). https://doi.org/10.1088/1742-6596/1417/1/012042
- Fitri, N. L., & Prahmana, R. C. I. (2019). Misconception in fraction for seventh-grade students. *Journal of Physics: Conference Series*, *1188*(1). https://doi.org/10.1088/1742-6596/1188/1/012031
- Hernawati, K., & Jailani. (2019). Mathematics mobile learning with TPACK framework. *Journal of Physics: Conference Series*, *1321*(2). https://doi.org/10.1088/1742-6596/1321/2/022126
- Hutajulu, M., Wijaya, T. T., & Hidayat, W. (2019). the Effect of Mathematical Disposition and Learning Motivation on Problem Solving: an Analysis. *Infinity Journal*, *8*(2), 229. https://doi.org/10.22460/infinity.v8i2.p229-238
- Kay, R., & Kletskin, I. (2012). Evaluating the use of problem-based video podcasts to teach mathematics in higher education. *Computers and Education*, *59*(2), 619–627. https://doi.org/10.1016/j.compedu.2012.03.007
- Kerres, M. (2020). *Against All Odds : Education in Germany Coping with Covid-19*.
- Khatimah, H., & Sugiman, S. (2019). The effect of problem solving approach to mathematics problem solving ability in fifth grade. *Journal of Physics: Conference Series*, *1157*(4). https://doi.org/10.1088/1742-6596/1157/4/042104
- Khotimah, K., Yuwono, I., Rahardjo, S., Universitas, P. M., & Malang, N. (2016). Penerapan Pembelajaran Inkuiri untuk Meningkatkan Hasil Belajar Trigonometri pada Siswa Kelas X. *Jurnal Pendidikan*, *1*(11), 2158–2162.
- Miguel-Revilla, D., Martínez-Ferreira, J. M., & Sánchez-Agustí, M. (2020). Assessing the digital competence of educators in social studies: An analysis in initial teacher training using the TPACK-21 model. *Australasian Journal of Educational Technology*, *36*(2), 1–12. https://doi.org/10.14742/ajet.5281
- Murphy, M. P. A. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy*, *0*(0), 1–14. https://doi.org/10.1080/13523260.2020.1761749
- Mushipe, M., & Ogbonnaya, U. I. (2019). Geogebra and Grade 9 learners' achievement in linear functions. *International Journal of Emerging Technologies in Learning*, *14*(8), 206–219. https://doi.org/10.3991/ijet.v14i08.9581

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

- Nizarwati, N., Hartono, Y., & Aisyah, N. (2013). Pengembangan Perangkat Pembelajaran Berorientasi Konstruktivisme Untuk Mengajarkan Konsep Perbandingan Trigonometri Siswa Kelas X Sma. *Jurnal Pendidikan Matematika*, *3*(2). https://doi.org/10.22342/jpm.3.2.328
- Oner, D. (2020). A virtual internship for developing technological pedagogical content knowledge. *Australasian Journal of Educational Technology*, *36*(2), 27–42. https://doi.org/10.14742/ajet.5192
- Peters, M. A., Wang, H., Ogunniran, M. O., Huang, Y., Green, B., & Chunga, J. O. (2020). China' s Internationalized Higher Education During Covid-19 : Collective Student Autoethnography. *Postdigital Science and Education*. https://doi.org/10.1007/s42438-020-00128-1
- Redmond, P., & Lock, J. (2019). Secondary pre-service teachers' perceptions of technological pedagogical content knowledge (TPACK): What do they really think? *Australasian Journal of Educational Technology*, *35*(3), 45–54. https://doi.org/10.14742/ajet.4214
- Rohaeti, E. E., Bernard, M., & Primandhika, R. B. (2019). Developing interactive learning media for school level mathematics through open-ended approach aided by visual basic application for excel. *Journal on Mathematics Education*, *10*(1), 59–68. https://doi.org/10.22342/jme.10.1.5391.59-68
- Sofyadin, R. T. (2019). Implementation The Problem Based Learning Models To Improve Learning Outcomes Of XI Iis 1 Class 2 State High School Students Baubau Southeast Sulawesi. *LA GEOGRAFIA*, *17*(3).
- Suan, L., Ying, Z., & Wijaya, T. T. (2020). Using hawgent dynamic mathematics software in teaching arithmetic operation. *International Journal of Education and Learning*, *2*(1), 25–31. https://doi.org/10.31763/ijele.v2i1.97
- Sukaesih, S., Ridlo, S., & Saptono, S. (2019). Development of biology teaching management textbooks based on competency and conservation to maximize Pedagogical and Content Knowledge (PCK) the prospective teachers. *Journal of Physics: Conference Series*, *1321*(3). https://doi.org/10.1088/1742-6596/1321/3/032114
- Tezer, M., & Karasel, N. (2010). Attitudes of primary school 2nd and 3rd grade students towards mathematics course. *Procedia - Social and Behavioral Sciences*, *2*(2), 5808–5812. https://doi.org/10.1016/j.sbspro.2010.03.947
- Tossavainen, T., & Faarinen, E.-C. (2019). Swedish Fifth and Sixth Graders' Motivational Values and the Use of ICT in Mathematics Education. *Eurasia Journal of Mathematics, Science and Technology Education*, *15*(12). https://doi.org/10.29333/ejmste/108533
- Wijaya, T. T., Purnama, A., & Tanuwijaya, H. (2020). Pengembangan Media Pembelajaran Berdasarkan Konsep Tpack pada Materi Garis dan Sudut Menggunakan Hawgent Dynamic Mathematics Software. *JPMI – Jurnal Pembelajaran Matematika Inovatif*, *3*(3), 205–214. https://doi.org/10.22460/jpmi.v1i3.205-214
- Wijaya, T. T., Ying, Z., & Purnama, A. (2020a). The empirical research of hawgent dynamic mathematics technology integrated into teaching. *Journal Cendekia: Jurnal Pendidikan Matematika*, *04*(01), 144–150.

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950

- Wijaya, T. T., Ying, Z., & Purnama, A. (2020b). Using Hawgent Dynamic Mathematics Software in Teaching Trigonometry. *International Journal of Emerging Technologies in Learning*, *15*(10), 215–222. https://doi.org/10.3991/ijet.v15i10.13099
- Wijaya, T. T., Ying, Z., & Suan, L. (2020). Gender and Self-regulated Learning During COVID-19 Pandemic in Indonesia. *Jurnal Basicedu*, *4*(3), 725–732. https://doi.org/10.31004/basicedu.v4i3.422
- Yuliani, T. W., Fuad, Y., & Ekawati, R. (2019). Student's Multiple Representation in Solving Addition and Subtraction of Fraction Problem. *Journal of Physics: Conference Series*, *1417*(1). https://doi.org/10.1088/1742-6596/1417/1/012050
- Zhu, X., & Liu, J. (2020). Education in and After Covid-19: Immediate Responses and Long-Term Visions. *Postdigital Science and Education*. https://doi.org/10.1007/s42438-020-00126-3

Fecha de recepción: 08-06-2020 Fecha de aceptación: 11-06-2020
Wijaya, T. T. (2021). Cómo los estudiantes chinos aprenden matemáticas durante la pandemia de coronavirus
International Journal of Educational Research and Innovation (IJERI), 15, 1-16
ISSN: 2386-4303 DOI https://doi.org/10.46661/ijeri.4950