Development Of Mobile-Based Learning Media Using The Construct 3 Application In Informatics Subjects

Angga Wicaksono
Universitas Bhineka PGRI Tulungagung

Fahrur Rozi
Universitas Bhineka PGRI Tulungagung

Alamat: JL. Mayor Sujadi Timur No 7 Tulungagung, 66221
Korespondensi penulis : rafifhasna16@gmail.com

Abstract. The development of technology has affected the world of education in the content of the material and the learning process. At SMP Negeri 1 Besuki, it is known that technology-based learning media has never been developed during learning. The learning media that runs at SMP Negeri 1 Besuki is considered boring for students. This learning media is expected to help students to understand learning independently and improve the ability to understand informatics subjects.This research uses the ADDIE development model which consists of five stages, namely: analysis, design, development, implementation and evaluation. The ADDIE model provides an opportunity to evaluate development activities at each stage, this has a positive impact on the quality of development products. Based on the results of the feasibility test from the media expert of 83.63%, the results of the feasibility test on the material test amounted to 84.44% and student respondents amounted to 82%. If calculated the average is 83, 35%. Based on the criteria guidelines above this product is declared "Very Feasible". Mobile-based learning media using Construtc 3 in informatics subjects at SMP Negeri 1 Besuki can be utilized properly, introducing this learning media to teachers and other students. To Mr. / Mrs. Teacher in order to use and utilize mobile-based learning media using Construtc 3.

Keywords: Education, Construct 3, Informatics

BACKGROUND

Education is an environment that has a very important role for a person in developing their abilities and potential (Suryosubroto, 2010). These abilities and potentials are used as provisions for life both individually and in society. Education is something that continues to be considered and developed for human progress from one generation to another. Education makes humans more directed so that they are able to face the changing times that occur due to advances in technology and science (Kemas Mas'ud Ali, 2016). Advances in technology and science make education inseparable from its influence. The results of technological advances have long been utilized in the field of education, for example computers, printing machines, speakers, CDs, earphones and many others (Jannah & Julianto, 2018).

Technological tools like this can change the way of thinking and working as well as the role of educators in delivering learning to students to make it easier to understand. Changes occur because of the efforts of each individual. Based on the results of interviews with Mrs. Hapsari Dwi Sulaksmi, S.Pd, as the seventh grade informatics teacher at SMP Negeri 1 Besuki, it is known that she has never developed or used technology-based learning media during

learning. The learning media used at SMP Negeri 1 Besuki is less than optimal. Learning media that has been used at SMP Negeri 1 Besuki is limited to manual learning media, such as explaining material and giving examples on the blackboard using books and using props. In other subjects and especially Informatics subjects also experience the same thing, namely the teacher cannot provide learning using LCD due to limited facilities and infrastructure available, at SMP Negeri 1 Besuki there are no LCDs in each class and only have 4 LCDs, from this which is an obstacle learning using technology becomes less and cannot be implemented at SMP Negeri 1 Besuki. Learning media that runs at SMP Negeri 1 Besuki is considered boring for students and not in accordance with the needs of students. It can be compared with the State Junior High School in the city, for example in Tulungagung State Junior High School 1, in each class there is an LCD that can support effective learning in each subject and is supported by the teachers who are active in developing learning media using technology. Learning activities in the category of one-way interaction patterns, namely patterns that place educators as action givers and action receiver students, where educators are more active and students are passive (Widyastuti, 2016). This limitation makes students have difficulty in understanding informatics subjects, both concepts and understanding of informatics. This statement is reinforced by data on the learning outcomes of students in class VII SMP Negeri 1 Besuki during the Midterm Test (UTS). The following table 1.1 states the learning outcomes of informatics class VII SMP Negeri 1 Besuki.

Table 1. 1 Study Results of Informatics class VII SMP Negeri 1 Besuki

Class	Student Grades (x)		Amount
	$0 < x < 80$	$80 \leq x < 100$	
VII A	26	6	32
VII B	23	9	32
VII C	24	8	32
VII D	24	8	32
VII E	30	2	32
VII F	4	24	28
VII G	12	17	29
Amount	143	74	217
Percentage	65,90%	34,10%	100,00%

THEORETICAL STUDY

Media Learning

1. Definition of Learning Media

The origin of the word "media" can be traced back to the Latin medius, which literally means "introduction," "intermediary," or "middle". The Arabic meaning states that the media functions as an intermediary or messenger from the sender to the receiver. According to Heinich, the media acts as a communication intermediary from the sender to the receiver.

However, a different view is expressed by Gerlach and Ely, who view media as people, materials, or events that can facilitate learners in acquiring knowledge, skills, and attitudes (Arsyad, 2010).

According to Sanaky (2013) in his work, learning is defined as, "a communication process that occurs between teachers, students, and learning materials." Furthermore, Mahnun argues that learning media are "communication tools and information conveyors used in the teaching and learning process to convey messages or information from message sources to message recipients, namely students." Thus, it can be concluded that learning media includes everything used by an educator to transfer teaching materials to students.

2. Purpose of using learning media

The utilization of learning media by students is intended to facilitate ease in the learning process in the classroom, increase learning efficiency, and maintain the link between subject matter and learning objectives, so that students are assisted in maintaining focus while learning (Sanaky, 2013).

3. Computer Software Based Learning Media

Learning media is used with the aim that the attention of students can be captivated, so that the learning process can be focused by them. The emotions and attitudes of learners are stimulated, understanding and memory of information are facilitated, and assistance is provided to learners who face difficulties in terms of the five senses (Arsyad, 2010).

4. Benefits of Using Learning Media

The benefits of using media are clarifying messages, overcoming limitations, increasing students' enthusiasm for learning resources, training students to learn independently according to their talents and abilities, bringing up the same perceptions, and creating a learning process between educators as communicators and students as communicants (Daryanto, 2010).

5. Principles of Learning Media

The ability of the media to explain messages more clearly, overcome limitations, increase students' enthusiasm for learning resources, train students to learn independently according to their talents and abilities, create uniform perceptions, and create a learning process where educators act as communicators and students as communicants is the usefulness of the media (Daryanto, 2010).

6. Learning Media Development

Consideration of learner competence is the main focus in systematically developing learning media. The stages that need to be considered in the selection and development of learning media are explained as follows by Rusman (2020):

"The selection of learning media involves consideration of learning objectives, subject matter, and competencies to be achieved. In addition, learning media are adapted to the abilities of students, educators, and school needs. The learning media design process is emphasized to support effectiveness and efficiency in teaching and learning activities. Evaluation of learning media is also carried out to measure the level of success and effectiveness. With this approach, the selection, design, and evaluation of learning media become interrelated elements that support the learning process as a whole."

7. Types of Learning Media

Some elements are involved in several types of learning media, such as human-oriented learning media, print learning media, visual learning media, audio-visual learning media, computer-based learning media, and computer software-based learning media (Arsyad, 2010).

a. Human-based Learning Media

A key tool in the delivery of information is the utilization of human-based learning media, which has the potential to change attitudes and is able to monitor learners' learning activities directly. By conducting guided explorations that analyze activities in the learning environment, learners can be guided and influenced by this medium during the learning process. In this way, learners' needs can be identified and learning objectives can be supported by the media. In addition, learning media can also be humanized, involving the role of educators, teachers and peers (Tasyari et al., 2021).

b. Print-based Media

Consideration should be given to consistency, format, organization, attractiveness, font size, and the use of white space in the design process of commonly known print media, such as books, journals, magazines, and papers. Specific properties of printed media involving linear text layout, one-way and passive communication, static text, the developmental effects of linguistic principles and visual perception, student orientation, and the ability of users to reorder information (N Suryani, A Setiawan, 2021) should be considered.

c. Audio-Visual Based Media

A type of media in which information is conveyed through mechanical or electronic

devices such as projectors, tape recorders, and wide visual projectors, using audio-visual elements. Both the senses of sight and hearing are involved in the use of this media. Dynamic visualizations in linear-based audio-visual media are presented in a planned manner by the designer, and their development is based on the principles of behaviorism and cognitive psychology. The role of the teacher is the main focus of this media, so student interaction tends to be minimal (Cecep Kustandi & Bambang Sutjipto, 2011).

Construct 3 Application

An HTML5-based application for 2D platforms called Construct 3, is a tool or game editor (Silvester Dian Handy Permana, 2016). Setting commands in Construct 3, which consists of events and actions, is done through evensheet. Thus, making games or applications in Construct 3 does not require an understanding of specialized programming languages (Gullen, 2011). Optimally, the visual editor function and behavior-based logic system in the software have been developed.

1. *Star Page*

   The initial interface in Construct 2 is known as the "Star page," where users are provided with various links to create new projects, continue current projects, browse project examples, gain understanding through manuals and tutorials, and use other functions.

2. *User Interface*

   The following is a description of some of the key elements in the Construct 2 user interface along with a general explanation of each element.

   - File Menu and Ribbon Tabs

     The design of the tollbar used in Construct 2 resembles that of Office 2007 or later. The menu file is represented by a blue button with a down arrow, while project settings can be done through drop down buttons on the ribbon tab. There is also a quick-access toolbar that includes functions such as save, undo, redo, preview, and more.

   - Layout View

     The place where the objects that will be used to create the game, design the levels and stages of the game, create the menu view, and the like are called the layout view.

   - Propertises Bar

     The place to set the characteristics of the clicked object is the Properties bar, which includes objects such as layouts, objects, layers, animations, and so on.

- Projects Bar and Layers Bar

   The function of the Project Bar tabs or Layer Bar tabs is to select the Project Bar or Layers Bar to be used.

- Object Bar

   The various objects incorporated in the game project are loaded in the object bar. The process of dragging and dropping objects into the layout can be done directly from this bar. In addition, the arrangement of objects in the bar can be adjusted to the desired position via the right-click function.

- Status Bar

   The location of the status bar that contains information about long-running tasks, events in the project, estimated game file size, currently used layers, mouse pointer coordinates, and zoom level is located at the bottom of the editor screen.

- Top Right Button

   Several buttons are located in the upper right corner, including buttons to minimize, maximize, and close the window, as well as the pinribbon button that is used to set the ribbon tab display. In addition, there is also an "about" button that opens a dialog window containing credits and information about the Construct 3 software.

Informatics Subjects

Informatics subjects, which are part of the Merdeka Belajar curriculum, are taught to grade VII students. One of the materials included in this curriculum is the operating system. This topic covers the main functions of the operating system, which allows the computer to operate. Effective interaction between users and computers can occur because the operating system serves as an intermediary. The operating system, also known as system software, is first run when the computer is turned on.

Secondary storage such as hard disks, SSDs, and other media generally houses the operating system. Critical services, such as task scheduling, memory management, setting up interactions with users, and access to secondary storage, are provided by the operating system for other operating software. The kernel, known as the code component that executes these key services in the operating system (BSI Today, 2022).

RESEARCH METHODS

A. Research and Development Methods

In this study, the type of research applied is development research that produces products in the form of learning media. The selection of research and development methods as

an approach is carried out to create a specific product and test the extent of its effectiveness (I Made Tegeh, I Nyoman Jampel, 2014).

The seventh grade students who have difficulty in informatics lessons will be given support through this learning media. The ADDIE development model, which consists of five phases (analysis, design, development, implementation and evaluation) was applied in this study, as described by Jampel and his colleagues in 2014 (page 42).

This study utilizes the ADDIE model because it is considered more dynamic, effective, and can improve the performance of the program (Pribadi, 2020). By having five clear steps or stages, this model allows the development of various development products, such as textbooks, learning modules, learning videos, multimedia, and so on, so that they can be easily understood and applied. The opportunity to evaluate development activities at each stage is provided by the ADDIE Model, which in turn has a positive impact on the quality of development products (Megawati, Astini, Syahputra, & Zulkarnaini, 2022). The systematic structure of the ADDIE development model, which consists of 5 interrelated components, indicates that its application should be done systematically from the first to the fifth stage, and cannot be sequenced randomly. In comparison to other design models, these five stages are considered very simple. Due to its simplicity and systematic structure, this design model can be easily understood and applied, as stated by Tegeh & Kirna (2013).

B. *ADDIE Model*

The ADDIE development model, which consists of five phases: analysis, design, development, implementation, and evaluation, has been described by Sugiyono (2016). In this study, a chart form that represents the steps of ADDIE development research can be found.

C. Research & Development Procedure

1. Analysis Phase

In this phase, class VII at SMP Negeri 1 Besuki is conducting an analysis which includes several activities, namely:
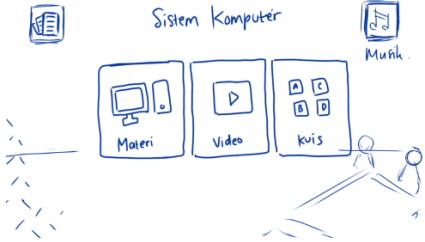
a. evaluating the utilization of facilities and infrastructure.

b. analyzing the learning process at grade level VII.

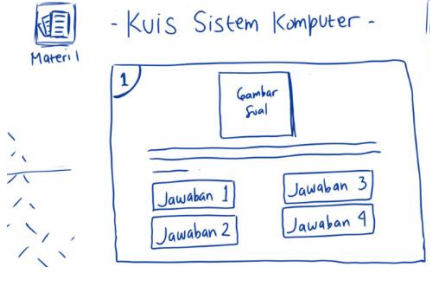c. evaluating the use of learning media in class VII.

The purpose of the entire analysis process is to understand the needs required at the seventh grade level, and also to provide advice to researchers so that they can develop media that suits these needs at that level. This analysis was conducted thoroughly.

2. Planning (Design)

   This step is considered the next step after the analysis stage. In this step, the design was carried out by following the following steps:

   a. Learning media users are determined.

   b. Competencies and indicators to be achieved through learning media are determined.

   c. Media design that supports the achievement of predetermined competencies and indicators is designed.

   d. The background color is arranged so that students feel comfortable during the learning process.

   e. The level of student mastery after using the media that has been designed by the researcher is determined. The purpose of this activity is to facilitate the delivery of information and material during the teaching and learning process by the teacher.

Product Display Design	Description
	Home page **Start: Next**
	Home Material Selection Menu **Computer Systems** **Computer Network** **Internet** **Music**
	Material Menu **Material Menu** **Material** **Video** **Quiz** **Music**

Product Display Design	Description
	Video Material **Material 1** **Learning Video** **Music**
	Computer Systems Quiz **Material 1** **Computer System Quiz** **Music**
	Quiz Score Display **Material 1** **Quiz Score** **Music**

3. *Development*

The development stage involves the process of transforming design specifications into physical form, which in this case is product development in the form of informatics learning media. The product to be produced by researchers includes a combination of text media, customizable media, and subject matter. Researchers will evaluate the validity of the media that has been developed by involving two validators, namely material experts and media experts.

4. *Implementation*

The application of products that have been developed in learning aims to assess their impact on the quality of learning that is interesting, effective and efficient. The application of this learning media product is specifically implemented at SMP Negeri 1 Besuki.

5. *Evaluation*

In this final stage, researchers evaluate their activities to assess the quality of the media

products they have produced. This evaluation aims to determine the feasibility of the media that has been developed. The data obtained during the evaluation process is used to improve the quality of the products that have been developed.

D. Research Instruments

The following is the arrangement of the development data collection instruments in this study:

a. Interview

Interviews in research and development use a structured approach, where the process can be open-ended or unstructured. Therefore, these guidelines only cover the core of the interviews related to facilities and infrastructure as well as media usage. The flexibility of developing these guidelines remains open for possible changes in the future.

Interview Guidelines

No. Aspects	Indicator	Number
1. Learning	Students' enthusiasm is visible when they learn informatics. Students' behavior during the learning process in the classroom is apparent. Challenges arise in overcoming barriers to informatics learning by using learning media. Classroom infrastructure is also a concern to ensure completeness and comfort.	1,2,3,4
2. Learning methods used	Methods used in learning Informatics.	5
3. Teaching materials used	Teaching materials used in informatics learning. Benefits of the materials used.	6,7
4. Availability of learning media	The role of learning media in informatics learning. Learning media can help students learn. Media used by teachers in informatics learning. Learning media has been used or not.	8,9,10,11
5. Learners' responses when there is media and there is no media	Smooth learning when there is media and when there is no media.	12

Source: Researcher Modification

b. Observation

Researchers made observations with the aim of understanding the completeness of facilities and infrastructure, media utilization, and student attitudes towards the learning process in the classroom. The observation sheet was used as a guide by researchers to develop learning media that support the teaching and learning process.

Observation Guidelines

No.Aspects	Indicator	Number
1. Learning	Learning media helps in understanding the material	1,2
	Learning media helps achieve learning objectives	
2. Methods Learning	Methods used in learning	3
3. Use of learning media	1. Ease of media use	4,5,6,7
	2. Students become active in learning when using the media	
	3. Learning media is practical to use	
	4. Learning media can be used by all students	
4. Student response to media	Students feel happy when using the media	8,9
	Students are enthusiastic when using the media	
5. Media that used	Previously used learning media or not	10

Source: researcher modification

c. Questionnaire Sheet

A collection of written questions arranged to collect information from respondents is called a questionnaire.

Media Expert Instrument

No	Aspects	Indicator	Item No.
1	View	Background on every media page	1
		Typeface and size used on each page of the media	2
		Selection and suitability of color proportions on each media page	3
		Presentation of images on each media page	4
		The overall design of the media and its harmony with the learning content	5
		Cover and main menu design	6
2	Programming	Smoothness in terms of programming	7
		Quality of navigation buttons	8
		Quality of navigation structure	9
		Operating system access	10
		Program file capacity	11

Source: (Harahap & Nugroho, 2022)

Material Expert Instrument

Aspects	Indicator	Item No.
	Suitability of material content with learning outcomes	1
	Appropriateness of concept/theory content	2
	Suitability of questions on the evaluation menu with learning material	3
	Content coverage	4
Content	Illustration of material through examples	5
	Media potential in improving students' character	6
	Effectiveness of media as an aid to comprehension and retention of in-formation	7
	Advantages of delivering material using media in learning practice	8
	Quality of material presentation	9

Source: (Harahap & Nugroho, 2022)

Respondent/Student Instrument

No	Aspects	Indicator	Item No.
1	Software	Initial display	1
		Image quality	2
2	Communication	Font display	3
		Use of language	4
		Use of color combination	5
		Media layout	6
		Sound effect styling	7
3	Visual	Presentation of images/animations	8
		Button usage	9
		Installation	10
		Media can be opened	11
		Media operable	12
		Clear directions/instructions	13
		Media can run from start to finish	14
4	Material	Material according to learning objectives	15
		Material according to informatics subjects	16
		The material attracts students	17
		Media can be used	18
		Media according to student situation	19
		The flow of the material is clear	20

Source: (Hapsari & Zulherman, 2021)

RESULTS AND DISCUSSION

Mobile-based learning media using the construct 3 application in its development research has been applied to informatics subjects at SMP Negeri 1 Besuki Tulungagung. Students can utilize the media that has been developed as an alternative to Student Worksheets (LKS) and Package Books in the learning process. This research model is using ADDIE, based on the development procedures in the model, the development of mobile-based learning media using the construct 3 application is obtained as follows:

1. *Analysis*

   From the results of interviews with informatics subject teachers of class VII and observations conducted simultaneously at SMP Negeri 1 Besuki Tulungagung, the following information was obtained:

   a. The learning media used is only a package book as a means of student learning, there is no LKS as an additional media and student evaluation.

   b. LCD projectors are only certain classes that have LCD projectors as a means of learning, so the learning process in most classes only uses textbooks.

   c. During the learning process, students pay attention to the material provided but the student response is quite low when there is a question and answer.

2. *Design*

At this stage is the process of planning the learning media application system and also the process of making pre-made displays and also starting to compile material based on learning objectives with material sources from books, the internet or on independent learning platforms. Learning Media Design Design (Story Board) there are several menus:

a. Setting the blue color on the base color and background with the aim that students can be comfortable in carrying out learning.

b. Menu Options Instructions serve to understand how to use the learning media application

c. ATP menu is part of the learning objectives in informatics subjects

d. The start menu in which there are 2 materials on informatics lessons, namely Information Communication Technology and Computer Systems. In each material there is a material menu, video menu and quiz menu.

1) Students can utilize the Material Menu to explore informatics learning information from textbooks and internet sources.

2) Quiz Menu, is a menu used to measure the level of student understanding of the material.

3) The Video menu contains more details of the materials, starting from explanations and examples.

CONCLUSION

Based on this research, it is concluded that the research on the development of mobile-based learning media using Construct 3 in informatics subjects in class VII at SMP Negeri 1 Besuki uses the ADDIE research method, namely analysis (analysis), design (design), development (development), implementation (implementation) and evaluation (evaluation).

Based on the results of the feasibility test from the media expert of 83.63%, the results of the feasibility test on the material test amounted to 84.44% and student respondents amounted to 82%. If calculated the average is 83, 35%. Based on the criteria guidelines above this product is declared "Very Feasible".

DAFTAR REFERENSI

Arsyad, Azhar. (2010). Media pembelajaran. Azhar Arsyad. *Ed*, Vol. 1.

Cecep Kustandi & Bambang Sutjipto. (2011). *Media Pembelajaran: Manual dan Digital*. Bogor: Ghalia Indonesia.

Daryanto. (2010). *Media Pembelajaran*. Bandung: Sarana Tutorial Nurani Sejahtera.

Gullen, Ashley Gullen /. Thomas. (2011). *Beginner's guide to Construct 2-Free Tutorial*.

Hapsari, Gita Permata Puspita, & Zulherman, Zulherman. (2021). Pengembangan Media Video Animasi Berbasis Aplikasi Canva untuk Meningkatkan Motivasi dan Prestasi Belajar Siswa. *Jurnal Basicedu*, *5*(4).

Harahap, Lenni Khotimah, & Nugroho, Deni Ebit. (2022). Pengembangan Media Pembelajaran Mobile Learning Terintegrasi Augmented Reality dan Unity of Sciences Materi Stoikiometri. *Journal of The Indonesian Society of Integrated Chemistry*, *14*(1). https://doi.org/10.22437/jisic.v14i1.15962

I Made Tegeh, I Nyoman Jampel, Ketut Pudjawan. (2014). *Model Penelitian Pengembangan*. Yogyakarta: Graha Ilmu.

Jannah, M., & Julianto, J. (2018). Pengembangan Media Video Animasi Digestive System Untuk Meningkatkan Hasil Belajar Siswa Mata Pelajaran Ipa Kelas V. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, *6*(2).

Kemas Mas'ud Ali. (2016). INTEGRITAS PENDIDIKAN AGAMA ISLAM TERHADAP ILMU PENGETAHUAN DAN TEKNOLOGI. *Karim,Ahmad*, *II*(1).

Megawati, Cut, Astini, Dewi, Syahputra, Ichsan, & Zulkarnaini. (2022). Penggunaan Model ADDIE dalam Pengembangan Bahan Ajar. *BAKTIMAS: Jurnal Pengabdian Masyarakat*, *4*(2).

N Suryani, A Setiawan, A. Putria 2019. (2021). *Media pembelajaran inovatif dan pengembangannya*.

Pribadi, Benny A. (2020). Desain dan Pengembangan Program Pelatihan Berbasis Kompetensi Implementasi Model ADDIE. In *Kencana*.

Rusman. (2020). Konsep Dasar Teknologi Informasi. *Medium.Com*.

Sanaky, Hujair A. H. (2013). Media pembelajaran interaktif-inovatif. *Yogyakarta: Kaukaba Dipantara*.

Silvester Dian Handy Permana. (2016). Pembangunan Aplikasi Game Android Pengenalan Pola Warna Pada Paud Posdaya. *Jurnal Infotel*, *7*(2), 113–120.

Sugiyono. (2016). *Metodologi Penelitian Kuantitatif, Kualitatif, dan R &D*. Bandung: Alfabeta.

Suryosubroto. (2010). *Beberapa Aspek Dasar-Dasar Kependidikan*. Bandung: Rineka cipta.

Tasyari, Salsabila, Putri, Fadila Nur'anfa, Aurora, Alifa Alya, Nabilah, Salwa, Syahrani, Yodellia, & Suryanda, Ade. (2021). Identifikasi Media Pembelajaran Pada Materi Biologi Dalam Meningkatkan Pemahaman Konsep Peserta Didik di Masa Pandemi Covid-19. *BIO-EDU: Jurnal Pendidikan Biologi*, *6*(1). https://doi.org/10.32938/jbe.v6i1.905

Tegeh, I. Made, & Kirna, I. Made. (2013). Pengembangan Bahan Ajar Metode Penelitian Pendidikan dengan ADDIE Model. *Jurnal IKA*, *11*(1).

Widyastuti, Rany. (2016). Pola Interaksi Guru dan Siswa Tunanetra. *Al-Jabar : Jurnal Pendidikan Matematika*, *7*(2). https://doi.org/10.24042/ajpm.v7i2.40