



# Development of Learning Videos on Programming Language Courses Hypertext Markup Language Material

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**Abstract.** Programming languages require HTML media materials that guide them step by step to complete the HTML work process. Visualizing the basic work steps of web design programming in programming language courses greatly influences lecture results. This research aims to develop a learning video of HTML (HyperText Markup Language) based web programming primary material that is valid, practical and effective in programming language courses. In this study, researchers used the R&D research method, and the 4D (four-D) model HTML-based e-learning video was designed using King Master and Android. The media validity evaluation result of 0.74 and the material validation evaluation of 0.87 were also declared valid by the validator. The practicality of the introductory HTML web programming tutorial video is 70.92 and 81.57%, which means the tutorial video is very practical. Effectiveness states that this educational video is recognized as effective because it has an approval score of 0.30, higher than 0.69 for the class average.

**Keywords:** Learning Video, Programming Language, Hypertext Markup Language.

## 1 Introduction

Learning videos are beneficial and must be developed to support learning activities at every level of education [1-3]. As a non-print teaching material, learning videos can present moving images; viewing learning videos is also supported by a narrative description of the learning material so that it can function two sensory organs of cadets at once, namely the senses of sight and hearing. The use of both sensory tools simultaneously allows cadets to understand learning messages more meaningfully, and information can be received as a whole so that by itself, the information will be stored in memory for a long time and be able to reconstruct learning experiences [4,5].

Learning videos can be used classically [6]; the video is shown in front of the class using the LCD, and then the cadets focus on watching from their respective places [7]. Lecturers can provide additional information when the learning video is played so that time and energy will be more effective and efficient; if the cadets do not understand, the video can be played back in the required part and stopped as desired. In addition,

cadets can also use learning videos individually to further study learning materials outside of class hours and as a guide in completing written and practical assignments.

Learning videos are proven to be very good at increasing the effectiveness of cadets' learning. The learning outcomes are better than those of cadets who use conventional media. Learning videos that are well packaged and use various applications have various benefits, as expressed: (1) Creating freshness with various learning processes; (2) Much more motivates student learning; (3) Able to provide insight and student learning experience because it reflects non-verbalistic learning; (4) Students can learn independently [8]. Due to the various benefits, as explained above, it is appropriate for educational practitioners in Indonesia to start paying attention to developing learning videos that are valid, effective and practical for each course.

Learning videos are available at almost all levels of education in Indonesia. There are learning videos deliberately designed for learning; usually, one video contains one subject matter to help lecturers in teaching. The role of the lecturer shifts to a learning facilitator, which makes it easy for cadets to learn [9,10]. In line with the development of information technology, the internet has been utilised by most people to upload and download learning videos, both by individuals directly related to education and the general public. The internet has revealed a wide variety of learning videos that can be downloaded from websites such as YouTube, Google Video, and Yahoo Video, which offer thousands of short clips, lecture material on a variety of topics in their entirety. One example of a learning video application that is currently featured in commercial adverts is Quiper video. This app offers paid interactive videos where the learning material is presented according to the user's education level. On the other hand, the development of smartphone technology has indirectly contributed to facilitating access to learning videos [11].

The use of smartphones makes video users no longer need to provide a set of computers or laptops along with the internet network but use a mobile phone that has been equipped with the required applications [12-14]. This further overcomes the limitations of obtaining learning videos or other valuable materials. On the other hand, users can use a smartphone video camera to record objects and important events related to learning materials and then create various applications to be utilised as learning videos to build increased learning activities. Some teachers and cadets made videos of scientific experiments, interviews, performances and others. Cadets from some classes submit video projects and end-of-semester projects containing video components [15].

Learning videos can be used in all courses, one of which is in the Programming Language course [16]. Programming Language courses must be completed by cadets in order to continue to the next level of the semester. This course discusses the basic concepts in understanding HTML-based web programming. After attending the lecture, cadets are expected to be able to practice step by step in the process of designing a simple web display. Therefore, this course is an introductory course that cadets must complete to complete their education.

Understandable differences between cadets mean that web programming is still imperfect. Some problems in the second-semester programming language lecture process show that cadets generally have difficulty understanding lecture material, directly impacting cadets' work, who are often limited to parts of the material. It takes

a long time to prepare the material to achieve these errors, especially during the general pandemic in distance learning. This is due to several factors, including the perceptions of cadets from different schools, namely SMK / SMA and MA. For cadets who graduated from SMA/MA, HTML material is new information.

The demonstration method is suitable for explaining each step of web design [17,18]. Based on the researcher's observation, the cadets were very enthusiastic in paying attention to the lecturer's explanation when the lecturer introduced the web design steps. Using the example method, it was clear that step-by-step improved the cadets' understanding of practical learning. On the other hand, cadets have different understanding abilities, so repeated demonstrations to cadets who do not understand HTML-based programming material take up much time in the learning process.

Based on the author's interviews with some cadets who completed the programming language course, they stated they needed a resource to guide them through HTML workflow. The lack of a valid, practical and effective learning environment to visualise the basic working steps of web design programming in the programming language course also affects the lecture process and subsequent end-of-semester degree results. To produce qualified graduates in information technology, efficient and effective study planning is required [19]. This method can include improving learning materials, presenting materials in the classroom, and discovering and developing learning materials.

Based on the description above, the author argues that research is needed to find and develop new learning environments through learning videos. The educational videos produced in this development study are expected to improve cadets' understanding of the working steps of web design using HTML to improve the learning outcomes of Marine Transportation cadets and become a significant learning model. Therefore, the researcher titled this study "Development of Hypertext Markup Language educational video material in the West Sumatra Shipbuilding Polytechnic programming language course.

## **2 Methods**

### **2.1 Type Research**

Based on the research background and the formulation of the problem, the research and development method is used, which is used in making sure products and testing the effectiveness of these products. "The 4-D development model is used as a development research model, namely: defining, planning, developing, and disseminating [20].

### **2.2 Research Stages**

The implementation of this research begins with the defining stage (Eliza et al., 2019). The purpose of the defining stage is to define the main problems that can describe the learning process in lectures, so the development of learning videos is needed [21,22]. The analysis is carried out through literature research or preliminary research. The form of activities carried out at the defining stage are:

### 2.3 Preliminary Analysis

This initial analysis followed the problems and events encountered in learning programming language courses from the beginning. On the other hand, problems and obstacles can also arise from the results of interviews with lecturers and cadets participating in lectures.

### 2.4 Learner Analysis

Cadet analysis was conducted to find out the characteristics of cadets. By knowing the characteristics of cadets, researchers can design learning videos suitable for college cadets. Based on their intellectual development, cadets are included in the category of people who already have media, i.e. the ability to use computers, and who are interested in something interesting, so that when making HTML-based web programming language educational videos, cadets are expected to be more active in lectures and know how to design web pages correctly with performance results.

#### a. Task Analysis

At this stage, the researcher had to analyse the essential tasks that the cadets had to master in order to achieve minimum competence in basic web programming. The researcher analyses the main tasks and additional skill sets that may be required. This analysis aims to analyse the reviews that must be covered in the lecture material delivered in the learning video so cadets can adequately carry out the main tasks [23].

#### b. Concept Analysis

Concept analysis identifies the concepts that will be taught and that must be mastered by cadets [24]. Concept analysis is carried out by analysing the Course Synopsis and Materials/Subjects and analysing learning resources to support the development of learning videos.

[1]. Analysis of Course Synopsis Examining the synopsis of the Programming Language course.

[2]. Analysis of Materials/Subjects Examining the materials/subjects in the Programming Language course: HTML material.

[3]. Analysis of learning resources to support planning the learning video and the programming language course reference book must be reviewed. The course supervisor conducted data analysis, and the printed books and reference materials used by the lecturer were checked. In the data analysis, the researcher systematically organised the main concepts elaborated in subthemes. Based on the course summary and the material/topic, the researcher put the material points into the HTML-based web programming material tutorial video.

#### c. Learning Outcomes

The research formulated learning outcomes, which are changes in behaviour expected after the learning process.

## 2.5 Design Stage

Activities carried out at this design stage include:

- a. Select an outline of course materials  
The materials to be displayed in this learning video are selected and compiled based on several considerations, namely the accuracy of the learning outcomes in the Programming Language course, the ability of cadets and the availability of learning resources.
- b. Selecting and organising programme content  
The content of the educational video programme is organised into material groups and learning outcomes for programming language courses. Then, brainstorm concepts, ideas, general storylines, and essential notes to remember when writing instructional videos. The design of the educational video is then discussed with members of the educational video production team. The discussion results are followed up with corrections and improvements to the flow of thought or production concepts that were not previously considered.
- c. Drafting the script  
A tutorial video script with complete steps is handy for video production as the production only needs to complete it according to the script's instructions.
- d. Testing and revising the script  
The team had to refine the design of the educational video scenario to see if it matched the programming language course material and learning outcomes if the material needed to be added or subtracted, and if the images and stories were appropriate and consistent with the intended concept. At this stage, the presentation format is chosen according to the educational video to be used. The chosen format should be engaging and help facilitate students' understanding of the programming language learning material.
- e. Learning video production  
The production stage is carried out by preparing the learning video production process, namely determining the devices used and the applications that will be carried out in video editing, directing the editor team according to the stages of the material to be made, and then sequencing the recording and sound in the video, viewing in sequence. HTML-based Web Basic Programming learning videos are made after the initial design is done. Video-making follows the existing design. Videos are displayed in images, text, and introductory voice guided by HTML material. This learning video is an application made using the King Masters programme.

## 2.6 Development Stage

The next step after designing the training video is the development stage. The purpose of this stage is to produce a product that is valid, practical and effective [25]. The development stage consists of two activities: peer review and development testing.

- a. Learning Environment Validation  
At this stage, a validation test is carried out to confirm or evaluate the feasibility of the product. For this activity, validation is carried out by an expert or validator. A source is considered valid if it fulfils the following conditions:

[1]. Didactical Requirements

Didactic requirements relate to the concept discovery process following the applicable curriculum and show individual differences so that good educational videos can measure cadets' abilities.

[2]. Structural Terms

Structural terms are terms related to sentence structure, simplicity and clarity of word use, which are practical and can be understood by cadets.

The next stage after the learning video has been designed is development. This stage aims to produce products that are valid, practical and effective. The development stage consists of two forms of activities, namely, expert appraisal and developmental testing.

b. Learning Media Validation

At this stage, a validity test is carried out to validate or evaluate the usefulness of the product; in this activity, the validation is carried out by experts or validators. The validation process involves face-to-face discussions or interviews with improvement experts, after which the design is evaluated by people who already understand the material [26]. Validator feedback was used as a guide for product improvement and release prior to testing [27]. Review activities include improvements and adjustments based on suggestions from validators and practitioners who are experienced in the field of study. Development Trial. At this stage, the learning videos that have been developed are trialled for evaluation. At this stage, activities are centred on seeing whether the learning video can be used as expected and is effective for improving the quality and learning outcomes of cadets. At this stage, the following steps are taken:

[1]. Practicality Test

Practicality is the use of learning media that has been developed. Researchers conduct product trials to find out the practicality of the learning media that has been developed [28]. Researchers conducted product trials in the Marine Transportation Study Programme. Practicality is obtained from the data analysis of observations of the lecture process using learning videos that have been declared valid by validators. Then, to find out the practicality of the learning video, the lecturer's response and the cadets' response were asked after using this learning video in the lecture process.

[2]. Effectiveness Test

The effectiveness of learning videos is measured to assess whether the learning videos developed can be used as expected to improve the learning outcomes of cadets [29]. The effectiveness test can be obtained by comparing scores in the psychomotor domain, namely from the assessment of cadets' performance or the assessment of the work produced by cadets before the learning process using learning videos and after the learning process using learning videos.

## 2.7 Dissemination Stage

Disseminate is the final stage in the development process [30]. This deployment stage is carried out to promote development products so that users, both individuals, groups and systems, can accept them. This form of dissemination aims to get input, corrections, suggestions, and assessments to improve the final results of the Learning Video Development of HTML-based web primary programming material so that it is ready to be used by learning video users.

# 3 Result and Discussion

## 3.1 Define

Programming Language Course Marine Transportation Study Programme West Sumatra Shipping Polytechnic. Based on a review of the situation in the field, it is known that the activities of the daily executor of a permanent nature are very dense, so there is a problem with the need for cadets to need media that can guide them in doing step by step in the HTML work process. The difference in understanding by cadets results in the web programming that is used is still not perfect. Some of the problems that occur in the process of lecturing Informatics Technology II courses there is HTML-based web programming material shows that cadets tend to have difficulty understanding lecture material; the direct impact of this can be seen from the results of the practice of cadets who tend to be reversed in the parts of the material to be achieved. These errors take a long time to complete the implemented material, especially in distance learning during the COVID-19 pandemic.

## 3.2 Learner Analysis

HTML-based web programming". These objectives were then integrated into video learning materials for teachers and cadets.

## 3.3 Design

### a. Preparation of learning materials

The lecture material shown in the learning video starts from the sequence of work steps for applying text formats, tables, multimedia, hyperlinks, forms and styles in presenting HTML-based web programming.

### b. Selecting and Normalising Program Content

The programme is included in the material group and learning outcomes. Programme content is arranged systematically based on the sequence of learning video material, level of difficulty and learning prerequisites [31]. The design must consider the material that must be shown first, and the sequence of shooting steps must also be considered so there is no repetition. The sequence of viewing lecture material in learning videos begins with an explanation of the work steps of the HTML concept in the application of text formats: text, tables, multimedia, hyperlinks, forms and styles.

Furthermore, it makes the flow of thought of concepts, ideas, complete storylines and essential notes that must be remembered during production in writing, such as: In the video I, Understand the concept of HTML web application technology in the application of text formats in presenting various web application development technologies. In video II, Understand the concept of HTML web application technology in the application of tables in presenting various web application development technologies. In video III, Understand the concept of HTML web application technology in the application of multimedia formats in presenting various web application development technologies. In video VI, Understand the concept of HTML web application technology in the application of hyperlink format in presenting various web application development technologies. In video V, Understand the concept of HTML web application technology in the application of form formats in presenting various web application development technologies. In video VI, Understand the concept of HTML web application technology in the application of formatting in display style and present various web application development technologies.

c. Drafting the Script

Scripting is done to facilitate the creation of learning video sequences according to the learning outcomes provided.

**Table 1.** Learning Video Script Structure

<b>Note</b>	<b>Image</b>	<b>Audio</b>
Video 1 (Text HTML)	HTML text formatting steps	Narration: explanation of HTML text formatting steps Music: Instrumental
Video 2 (Table HTML)	Step HTML table format	Narration: explanation of HTML table formatting steps Music: Instrumental
Video 3 (HTML Multimedia)	HTML multimedia format step	Narration: step-by-step explanation of HTML multimedia format Music: Instrumental
Video 4 (Hyperlink HTML)	Step HTML hyperlink format	Narration: explanation of HTML text formatting steps Music: Instrumental
Video 5 (HTML Form)	Step HTML form format	Narration: explanation of HTML form formatting steps. Music: Instrumental
Video 6 (style HTML)	Step HTML style formatting	Narration: explanation of HTML style formatting steps Music: Instrumental

d. Testing and Revising Scripts

The test results and script revisions can be seen in the table below:



**Table 2.** Structure of Learning Video Script After Revision

<b>Note</b>	<b>Image</b>	<b>Audio</b>
Video 1 (Text HTML) Meetings 3-5	Text formatting steps and HTML text display example	Narration: explanation of text formatting steps and HTML text display example Music: Instrumental
Video 2 (Table HTML) Meetings 6-7	Table formatting steps and HTML table display example	Narration: table format explanation and HTML table display example Music: Instrumental
Video 3 (HTML Multimedia) Meetings 9-10	Multimedia format steps and HTML multimedia examples	Narration: explanation of multimedia formats and examples of HTML multimedia Music: Instrumental
Video 4 (Hyperlink HTML) Meet- ings 11-12	Hyperlink formatting steps and HTML hyperlink display example	Narration: explanation of hyperlink formatting steps and example of HTML hyperlink display. Music: Instrumental
Video 5 (HTML Form) Meetings 13-14	Form formatting steps and HTML form display example	Narration: explanation of form formatting steps and HTML form display example Music: Instrumental
Video 6 (style HTML) Meetings 15	Style formatting steps and HTML style display	Narration: explanation of style formatting steps and HTML style display Music: Instrumental

e. Learning Video Production

The video tutorial is produced according to the script. This production stage starts with configuring the Notepad++ installation using a laptop or PC and discussing the key points. Detailed explanations are given in the sections of each video. Once the image description is complete, the next step is implementing the image process and adding audio (text reading and musical accompaniment). Finally, the tutorial videos have been integrated into the Android application to make it easier and more accessible, including the home page and start menu, the main menu screen of the application where the tutorial module was created earlier. Screen design results for the presentation of learning videos for the programming language course. Programming in the Internet Age developed in this research is a tool that can help educators deliver the content of teaching materials, especially HTML-based online teaching materials. The learning video used in learning programming language courses is designed by the semester learning plan tested on cadets.



**Figure 1.** Android App Display HTML-based Web Programming Learning Video

**3.4 Develop**

**a. Validity Test**

The development stage is the stage where researchers assess the products that have been developed through expert opinion. Product validity is carried out in the form of 2 assessments, namely the format of the learning video and the learning video material. Based on the results of the expert assessment, it can be explained the assessment of the results of the media validation that has been developed as follows:

**b. Learning Video Format Validity**

The results of the validity analysis of the learning video format are summarized in the following table:

**Table 3.** Summary of Validity Results for the Learning Video Format

No Item	Skor V Aiken	Description	Aspects	Skor V Aiken	Description
1	0,065	Valid	Construction	0,062	Valid
2	0,062	Valid			
3	0,059	Valid			
4	0,062	Valid	Construction	0,059	Valid
5	0,059	Valid			
6	0,055	Valid			
7	0,065	Valid			

8	0,059	Valid	Technical	0,061	Valid
9	0,055	Valid			
10	0,059	Valid			
11	0,059	Valid			
12	0,065	Valid			
13	0,059	Valid	View	0,060	Valid
14	0,059	Valid			
15	0,062	Valid			
16	0,059	Valid			
17	0,062	Valid			
18	0,062	Valid			
19	0,059	Valid			
20	0,059	Valid			

The validity test of the learning video format in the didactic feasibility aspect of the video has an average score of 0.90 with a valid category. The video construction aspect has an average score of 0.86 with a valid category, the technical aspect has an average score of 0.88 with a valid category, and the display aspect with an average score of 0.87 with a valid category. Thus, the learning video format developed is declared valid from all aspects of the assessment. Validation was carried out by experts (experts) respectively 1) Wilyansah, S.Kom., M.Pd.T. 2) Domi Sepri, S.T., M.Kom 3) Dr Muharika Dewi, S.T, M.Pd, 4) Tity Yusi, S.Pd., Gr, and 5) Rahmad Alqudri, M.Pd.Gr.

c. Validity of the Learning Video Materials

The results of the validity analysis of the learning video format are summarized in Table 4 below:

**Table 4.** Results of Validity of Learning Video Materials

No Item	Skor V Aiken	Description	Aspects	Skor V Aiken	Description
1	0,062	Valid	Content Quality Aspects	0,063	Valid
2	0,062	Valid			
3	0,065	Valid			
4	0,065	Valid	Quality of Learning	0,061	Valid
5	0,062	Valid			
6	0,055	Valid			
7	0,065	Valid			
8	0,059	Valid			
9	0,059	Valid	Quality of Interaction	0,062	Valid
10	0,065	Valid			
11	0,062	Valid			
12	0,059	Valid	Quality of Material Display	0,063	Valid
13	0,065	Valid			
14	0,062	Valid			
15	0,065	Valid			

16	0,062	Valid			
17	0,062	Valid			
18	0,065	Valid			
19	0,062	Valid			
20	0,062	Valid			

Based on Table 4 on the aspect of the quality of the content of the learning video material validation test, the valid category has an average score of 0.92, the learning aspect has an average score of 0.89 in the valid category, the interaction aspect has an average score of 0.90 in the valid category and seen from the aspect of material quality has an average score of 0.91 in the valid category. Thus, the learning video material is validated in all aspects of the assessment. The validation was carried out by five experts or validators, each of whom was 1) Wilyansah, S.Kom., M.Pd.T. 2) Domi Sepri, S.T., M.Kom 3) Dr Muharika Dewi, SST, M.Pd., 4) Tity Yusi, S.Pd., Gr. and 5) Rahmad Alqudri, M.Pd.Gr.

### 3.5 Disseminate

#### a. Practicality Test

Practicality in this research and development is assessed through the use of learning video media based on the perceptions of lecturers and cadets who use it. The following are the results of the practicality of learning video media based on the assessment of lecturers and cadets:

##### [1]. Practicality Assessment by Lecturers

The summary of the results of the practicality of video media based on the lecturer's assessment can be explained in the following table:

Table 5. Practicality Results of Learning Video Media in Lecturers' Perception

No	Skor	Description	Aspects	Skor	Description
Item 1	0,062	Very Practical	Convenience for lectures	0,061	Practical
Item 2	0,055	Practical			
Item 3	0,065	Very Practical			
Item 4	0,062	Very Practical			
Item 5	0,059	Practical			
Item 6	0,055	Practical	Time effectiveness	0,057	Practical
Item 7	0,062	Very Practical			
Item 8	0,059	Practical			
Item 9	0,062	Very Practical	Ease of Use	0,064	Very Practical
Item 10	0,062	Very Practical			
Item 11	0,059	Practical			

Based on the results of the practicality test of the HyperText Markup Language (HTML) Learning Video Material in the Programming Language Course in the perception of lecturers who became observers and practicality assessors, it can be explained that: 1) Ease of lecturing has an average score

of 0.88 with a practical category, 2) Time effectiveness has an average score of 0.83 with a practical category, 3) Ease of use has an average score of 0.93 with a very practical category. Four learning lecturers assessed this practicality.

[2]. Practicality Assessment by Cadets

The results of the practicality of video media based on the assessment of cadets can be explained in the following table:

Table 6. Practicality Results of Learning Video Media in Cadets' Perception

No	Skor	Description	Aspects	Skor	Description
Item 1	0,0590278	Very Practical	Convenience	0.85	Practical
Item 2	0,0597222	Practical			
Item 3	0,0618056	Very Practical			
Item 4	0,0576389	Very Practical			
Item 5	0,0652778	Practical	Time	0.93	Very Practical
Item 6	0,0576389	Practical			
Item 7	0,0625	Very Practical	Usability	0.86	Practical
Item 8	0,0590278	Practical			
Item 9	0,0625	Very Practical			
Item 10	0,0625	Very Practical			
Item 11	0,0583333	Practical			
Item 12	0,0590278	Practical			

Based on the results of the practicality test of the Hyper Text Markup Language (HTML) Learning Video Material in the Programming Language Course in the perception of cadets who use the media in the learning process, it can be explained that: 1) Ease of lecture has an average score of 0.85 with a practical category, 2) Time effectiveness has an average score of 0.93 with a very practical category, 3) Ease of use has an average score of 0.86 with a practical category. This practicality was assessed by cadets who participated in 40 lessons.

b. Effectiveness Test

The effectiveness test in this study was conducted to assess the effectiveness of the Hyper Text Markup Language (HTML) Learning Video in the Programming Language Course applied to the treatment group. Then, the analysis was carried out to compare the learning outcomes of cadets before and after treatment. The evaluation carried out is a summative evaluation to assess practical learning outcomes. The following are the results of the effectiveness research:

## [1]. Pre-test Learning Outcomes

Primary statistical data of research on cadets' learning outcomes before using HyperText Markup Language (HTML) Learning Videos in Programming Language Subjects can be seen in Table 7 below:

Table 7. Pre-test Statistical Test Results

<b>Statistics</b>		
Pretest		
N	Valid	40
	Missing	0
Mean		70.92
Median		67.50
Mode		65
Std. Deviation		10.400
Minimum		55
Maximum		90
Sum		2837

Based on the primary statistical data of the research results, it can be explained that the lowest score is 55, and the highest score is 90, with an average value of 70.92. The frequency distribution to assess the distribution of research data can be seen in Table 8 below based on the primary statistical data of the research results; it can be explained that the lowest score is 55, and the highest score is 90, with an average value of 70.92. The frequency distribution to assess the distribution of research data can be seen in Table 8 below:

Table 8. Frequency Distribution of Pre-test Learning Outcomes

<b>BK</b>	<b>Interval Class</b>	<b>F</b>	<b>% f</b>
1	55 – 60	5	12,5
2	61 – 66	15	37,5
3	67 – 72	4	10
4	73 – 78	5	12,5
5	79 – 84	6	15
6	85 – 90	5	12,5
<b>Total</b>		40	100

Based on Table 8, the frequency distribution of pre-test learning outcomes can be explained as the highest distribution is in the score range 61 - 66 with a frequency of 15 cadets or 37.5%. Based on the average score, it is known that the average value of cadets' learning outcomes before applying learning by using HyperText Markup Language (HTML) Material Learning Videos in Programming Language Subjects is 71, with a moderate category.

## [2]. Post-test Learning Outcomes

The primary statistical data of research on the learning outcomes of cadets after learning to use HyperText Markup Language (HTML) Learning Videos in Programming Language Subjects can be seen in Table 9 below:

**Table 9.** Post-test Statistical Test Results

<b>Statistics</b>		
Post-test		
N	Valid	40
	Missing	0
Mean		81.57.00
Median		80.00.00
Mode		80
Std. Deviation		7.489
Minimum		70
Maximum		95
Sum		3263

Based on the primary statistical data of the research results, it can be explained that the lowest score is 70, and the highest score is 95, with an average value of 81.57. The frequency distribution to assess the distribution of research data can be seen in the following table:

**Table 9.** Frequency Distribution of Post-test Learning Outcomes

<b>BK</b>	<b>Interval Class</b>	<b>f</b>	<b>% f</b>
1	70 – 73	6	15
2	74 – 77	6	15
3	78 – 81	11	27,5
4	82 – 85	6	15
5	86 – 88	2	5
6	89 – 95	9	22,5
<b>Total</b>		40	100

Based on Table 9, the frequency distribution of post-test learning outcomes can be explained as the highest distribution is in the score range 78 - 81, with a frequency of 11 cadets or 27.5%. Based on the average score, it is known that the value of cadets' learning outcomes before applying learning by using Learning Video HyperText Markup Language (HTML) Material in Programming Language Subjects is 82, with a high category.

## [3]. Difference between Pre-test and Post-test (N-Gain Score)

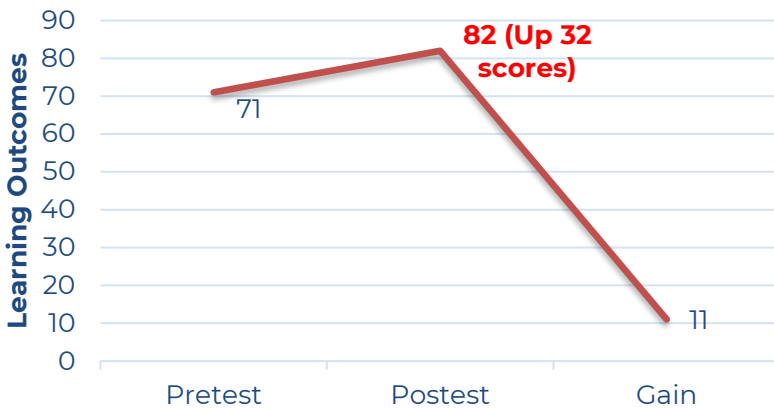
To see the effectiveness of the developed HTML-based Web Programming Learning Video, it is necessary to calculate the improvement of cadets' learning outcomes using gain scores. A summary of the results of the gain

score of the cadets' learning outcomes before (pre-test) and after (post-test) can be seen in the following Table 10:

**Table 10.** N-Gain Score of Cadet Learning Outcomes

Gain Category	f	%
Score Up	35	7,5
Score Down	3	5
Fixed Score	2	87,5
Total	40	100

Based on the calculation of the gain score, it can be explained that 35 cadets experienced an increase in learning outcomes after attending lectures using the HTML-based Web Programming Learning Video developed, three cadets experienced a decrease in learning outcomes, and two cadets had the same learning outcomes (fixed) after attending lectures with the developed media. By calculating the gain score formula, an increase of 32 scores was obtained, with the initial data of the pre-test average score at 71 rising to 82 during the post-test. An illustration of the increase in gain score can be seen in Figure 2 below:



**Figure 2.** Illustration of Score Gain Increase

The categorization of gain scores carried out after calculating using the formula obtained an increase of 32 scores. This score is in the range of  $0.30 < g < 0.69$  with a moderate category. Thus, the use of HTML-based Web Programming Learning Videos developed effectively improves the learning outcomes of cadets by 32 scores with a moderate category in the Programming Language Subject of HTML Material in the Programming Language Course of the D4 Marine Transportation Study Program of the West Sumatra Shipping Polytechnic.



## 4 Conclusion

Based on the results of research on making essential web programming tutorial videos based on HTML, the following conclusions are drawn:

- a. The development results of this research are in the form of products in the form of HTML-based web programming video tutorials for programming language courses. The development process in this video tutorial is related to the 4D development model. Define, design, develop and disseminate.
- b. This development research produces valid, practical and effective HTML-based web programming tutorial videos for programming language courses. This video tutorial was developed based on the course summary and syllabus of the programming language course.
  - [1]. The HTML-based web programming video tutorial developed is declared valid when validated by five validators: three media validation experts and two material validation experts. The result of the device validation score was validated at 0.74, and the result of the material validation score was 0.87, which was also validated by the validator.
  - [2]. The HTML-based video tutorial developed on basic web programming is practical when tested by programming language subject teachers and 40 cadets of Class 6 D4 Sea Transportation semester 2021/2022. The practicality assessment of the HTML-based basic web programming video tutorial by teachers and cadets was 70.92% to 81.57%, with the video tutorial included in the very practical category.
  - [3]. This HTML-based web programming tutorial video has performance testing steps with cadet psychomotor tests, namely, Pre-test and post-test are carried out on 40 cadets of sea transportation class 6 in 2021. The effectiveness test results state that this video tutorial is declared effective with a confirmation score of 0.30, more significant than 0.69 in the average level. So, it can be concluded that this tutorial is an effective video tutorial used in programming language courses with HTML-based web programming material. Programming language course instructors are encouraged to use HTML-based web programming tutorials in the programming language teaching process. This video tutorial can be used as a learning tool for programming language courses and for cadets to study in dormitories or at home outside the campus.

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