The Development of Statistic Instructional Materials for Integrated Student about Electronic Publishing Based Statistical Literacy

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Abstract

Good instructional materials are arranged systematically and they enable students to learn independently, up to date, easily digestible and designed in accordance with the applicable curriculum. This research aimed to determine the process and results of the development of integrated statistical instructional materials EPUB-based statistical literacy properly (valid, practical, and effective) and to determine whether there were significant differences between the pretest-posttest results. The type of research used was Research and Development (R&D) with the ADDIE type development model. The subjects in this research were 53 students of the mathematics education study program at Universitas Palangkaraya (UPR) and 41 students of the PGSD study program at Universitas Mushammadiyah Palangkaraya (UMPR). Data analysis used T-test and N-Gain test. The research results obtained were as follows: (1) The instructional materials developed contained statistical literacy and multimedia based, namely EPUB (2) The average validity obtained from the validator's assessment was 89.42% very valid of 89.42% (3) The average percentage of student responses to EPUB-based statistical literacy integrated instructional materials was 89.82%. Overall, instructional materials were in the very practical category. (4) student learning completeness reached 80.76%, there were 30 of 31 UPR students completed and student learning completeness reached 78, 80%, there were 22 UMPR students completed and it can be concluded that the use of EPUB was effective. (5) Furthermore, a significant difference can be seen from the UPR average of the experiment class posttest was 84.23 while the posttest control class was 61.23. It means that the post-test results of the experiment class were higher than the post-test results of the control class with a difference of 23 and the result of the N-gain score for the experiment class is 56.3% while the control class is only 4.24%. Meanwhile, a significant difference can also be seen from the average UMPR of the posttest experiment class was 78.14 while the posttest control class was 63.00. It means that the post-test results of the experiment class were higher than the post-test results of the control class with a difference of 15.14 and the results of the N-gain score for the experiment class are 56% while the control class was only 10%.

Keywords: *Electronic Publishing; Statistical Literacy; Development*

Introduction

Covid-19 (*Corona Virus Disease*) or well-known as corona virus gives impact on ten current aspect of life. It is not only in the health and the economy sectors; the greatest impact is also on the education sector. Such idea was also expressed by (Gallo & Trompetto, 2020:1-2; Herliandry, Nurhasanah, Suban & Kuswanto, 2020: 65-70; Rundle et al., 2020:1008-1009). The various efforts of the Indonesian government in suppressing the transmission of covid-19, especially in the field of education, are contained in the circular letter of the Minister of Education and Culture No.4 Year 2020 concerning the Implementation of Policies in an Emergency for the Spread of Covid-19. It explains that the teaching and learning process is conducted from home and it is carried out online or at a distance. Based on this circular, all aspects of education from kindergarten to tertiary institutions are "forced" to adapt as a whole and start implementing SFH (School From Home) and require educators, both teachers and lecturers to apply online learning. (Annur & Hermansyah, 2020:195-201; Atsani, 2020:82-93 & Pujilestari, 2020:49-56).

Various problems then arise. Along with the online learning process, there are limited learning media used, inadequate internet access, students' readiness to receive information and teachers in delivering material that has not been implemented properly. In line with results of the research conducted by (Farah & Nasution, 2020), The online lecture system has not been maximal, nothing can guarantee about the extent to which students are able to absorb the materials. Automatically, this fact also triggers uncertainty and great concern for the quality of college graduates. Higher education is a place with the hope of producing good quality graduates or human resources and efforts to support the OECD (Organization for Economic Cooperation and Development) program that has been promoted since 2005. It states that the OECD has made the focus of education reform around the world and teachers play a very important indicator to maintain and improve the quality of education in a certain area. country (OECD, 2005). Research by (Schachter, Gerde & Hatton-Bowers,2019:395-408) explained that prospective qualified educators are targeted to be able to develop new skills or add skills for use in their own classrooms. Some of the following research results reveal the problems faced by Mathematics Education students from various regions, including research by (Loviana & Baskara, 2020:61-69) who described that the application of online learning at Mathematics *Tadris* IAIN Metro Lampung resulted in less effective learning in terms of material delivery and assignments that were not maximal and difficult, it was obtained based on a questionnaire of the constraints that students felt in the online learning system. Next, the research by Yuniarti & Hartati (2020:158-167) revealed quantitative descriptive about students' perceptions of the application of e-learning at STIA Muhammadiyah Selong. The results obtained from the data analysis of student independence in completing assignments and understanding course material were classified as moderate (62%). The ease of access for students in accessing course material was in the quite high category (71.1%). However, the mastery of the material was classified as low. 73.6% of students said it was difficult to understand the instructional materials/teaching material and provide enrichment. Further research by Zamista, Rahmi, Sellyana & Desriyati (2020: 41-48) explained that the perceptions of students at STT Dumai had negative perceptions of online learning for calculus courses, both in terms of material content, interaction and learning environment. Students still argue for the calculus course the face-to-face learning process and direct explanations from the lecturer are more effective. Such research conducted Annur & Hermansyah (2020:195-201) mentioned that there are 3 difficulties faced by mathematics education students at STKIP Pamane Talino, as follow: (1) technical difficulties in the form of signal difficulties and limited quota; (2) difficulties in adapting students in the form of non-conducive housing conditions; and (3) lecturers' unpreparedness in the form of limited forms of material provided and applications to support instructional materials were not varied. On the other hand, in my opinion of (Zhang, 2017:243-249) The teacher should always update the teaching concept, as far as possible to adapt the instructional materials to attract students' attention during the teaching process, and demonstrate teaching as an effort to increase student enthusiasm. Therefore, an effective effort is needed to make instructional materials as facilities and learning experiences for students in mathematics education study programs that are flexible and can be used online and offline.

Some researches on the development of instructional materials using EPUB have been developed in the fields of mathematics, science, geography, and so on. Research by (Riyadi & Qamar, 2017:31-40) entitled "*Efektivitas e-modul analisis real pada program studi pendidikan matematika Universitas Kanjuruhan Malang*", the result showed the results of research the percentage of learning modules. 82.05% was indicated that the e-module with EPUB extension is in good qualification. A research done by (Marsitin, Sesanti & Agustina, 2018:1-6) entitled "*Pelatihan IT melalui pembuatan e-modul matematika bagi guru matematika SMK Kabupaten Malang*" showed the result that the community partnership program activities in the form of modules and e-modules with the EPUB extension for mathematics learning and these activities received a positive response from the SMK mathematics teachers. Furthermore, research by (Meliana, 2020:25-31) entitled "*Pengembangan e-modul format epub untuk pembelajaran matematika kelas X pada materi trigonometri*" showed the result that The e-module trigonometry was declared valid by the expert with a score of 85.42 in the very good category, effective in learning with the difference in the average difference in test scores between the experiment class and the control class of 18.26, 84.85% of students completed or reached KKM, and student responses of 81.82% are in the good category. Based on several researches on the development of EPUB-based instructional materials, there has not been any development in statistical instructional materials that are integrated with EPUB-based statistical literacy.

Statistical literacy is considered in peak position when the American Statistical Association's (ASA) set it as a guideline for assessing and teaching statistics education (GAISE, 2005). According to Best (2001, 2004) Statistical literacy studies the use of statistics as evidence for an argument. Students must be able to think critically about concepts, claims and arguments: to read, interpret and evaluate information. (Ben-Zvi & Garfield, 2004) also revealed that statistical literacy consists of basic and important skills used in understanding statistical information or research results. Statistical literacy includes understanding of concepts, vocabulary, symbols, and includes understanding probability as a measure of uncertainty. Furthermore, the opinion by (Brase & Brase, 2013) that statistical literacy is the ability to communicate concepts effectively, the concept can test statistical literacy and critical thinking skills by asking students to express their understanding in sentences. (Anderson, Gigerenzer, Parker, Schulkin 2014: 5-17) argued that statistical literacy can be defined as the understanding of statistical tests and the terminology required for the design, analysis, and conclusions of the results of research or laboratory testing. This is in line with the opinion of (Weiland, 2017:33-47), he said that statistical literacy is very important for individuals to be able to read, evaluate, and make decisions based on their statistical arguments with everyday circumstances and is useful for training data-based arguments. Based on the several opinions that have been presented, it can be concluded that statistical literacy is a special skill needed to analyze, interpret, and evaluate statistics as evidence. Statistical literacy can be taught even if students do not have a quantitative background, statistical literacy is usually more about words than numbers, more about evidence than about formulas. (Gal, 2002:1-25) assumed that statistical literacy involves a knowledge component (consisting of five cognitive elements: literacy skills, statistical knowledge, mathematical knowledge, context knowledge, critical question and a disposition component (consisting of two elements: beliefs and attitudes and critical stance).

Good instructional materials based on (Kember & Kwan, 2000:469-490) is about adapting to student needs, presenting ideas and theories by conceptualizing as precisely as possible, and using concrete examples and updates, thus, it eases students to remember. Instructional materials based on (Allwright, 1981:5-18) is a very specific component in the teaching and learning process, the instructional materials is more flexible and consists of idea models that can be used for various purposes. Furthermore, the opinion of (Khalil & Elkhider, 2016:147-156) stated that good instructional materials in the form of a systematic process in designing to increase the efficiency of instructional materials and facilitate student learning, the information presented is clear, attractive, and consistent. (Bulusan, 2019:218-231) revealed that good instructional materials are arranged with several components, such as cultural enrichment, authenticity of material, relevant language enrichment, and it can ease students to read and understand,

thus, learning becomes more meaningful and makes a positive contribution to learners. The characteristics of the instructional materials used in this research are the adoption of (Ika Lestari, 2013: 2) as follows:

a. *Self-Instructional;*
b. *Self-Contained;*
c. *Stand Alone;*
d. *Adaptive; dan*
e. *User friendly.*

Electronic Publication (*EPUB)* is a digital book format that was agreed by the International Digital Publishing Forum (IDPF) in October 2011. Epub replaces the role of Open eBook as an open book format. Epub consists of multimedia files, html5, css, xhtml, xml which are packaged in one file. (Southeast Asian Ministers of Education Organization Regional Open Learning Center (SEAMEOSEAMOLEC), 2014: 5). EPUB can be accessed free of charge and requires several coding languages in creation. (Marinai, Marino & Soda, 2011:478-482) revealed that EPUB is a widely used and supported format for e-books by most devices. The e-Pub document was created by a single ZIP archive which assembles multiple files containing both document metadata and main text content encoded in one or more suitable xhtml file types.The following is an overview of the EPUB creation scheme adopted from (Yang & Huang, 2016:35-46) and it was performed in this research:
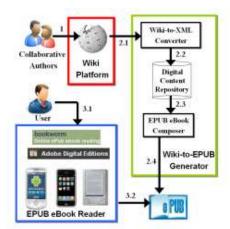

Figure 1. Creation Scheme of EPUB

Research Method

The research type used was R&D (Research and Development). Based on (Borg & Gall, 2007) R&D is a type of research that aims to develop new products or improve existing products. The research subjects were 53 students of Universitas Palangkaraya (UPR) mathematics education study program and 41 students of primary teacher education study program at the Universitas Muhammadiyah Palangkaraya (UMPR).

Result and Discussion

Description of Analysis Phase (*Analysis*)

In the analysis phase, an analysis of learning needs and student characteristics was carried out. Based on the results of observations on the availability of instructional materials that can be accessed both offline, lecturers have not prepared much to support the asynchronous learning process and have not yet varied. The basic need needed was that instructional materials that can be used without involving the internet/quota network were needed. Based on the RPS/Semester Lesson Plan analysis, learning activities

conduct a lot of practice with Microsoft Excel and Minitab, but in practice, students have to access video tutorials via Youtube. Hence, they find it difficult if internet access is inadequate.

Description of the Design Process (*Design*)

Activities conducted at this stage select learning media that are in accordance with the material and characteristics of students, choose the form of presentation of learning according to the learning media used, simulate the presentation of the material with the media and the learning steps designed during the learning simulation take place. The material design refers to the Statistics book. Meanwhile, the design of instructional media includes determining the type of media, the format of the presentation, the minimum specifications for electronic devices that can access epub. In the design stage, the researcher makes the initial product (prototype) starting from making the epub framework which consists of an introduction, learning and evaluation activities in accordance with the content framework of curriculum analysis and material in the RPS/Lesson Plan Followed by making instructional materials in the epub format (Syaroni and Amalia, 2016). To make instructional materials in the epub format, the main software and supporting software are needed. The main software is the Microsoft Word program for creating module scripts and the Sigil application for creating instructional materials in the epub format. Meanwhile, the supporting software includes Microsoft Excel and Minitab programs to make presentations that will later be converted into video, Googlemeet for making laptop screen recordings and video processing using KinemasterPro.

The Description of Development (*Development*)

At this development stage, steps consisted of validation by 2 material experts and 2 media experts then revising the EPUB based on suggestions from experts during validation. Matters that were validated included user manuals and EPUB tools. The following is a display of statistical literacy integrated instructional materials in Azardi's epub format developed through this research and development.
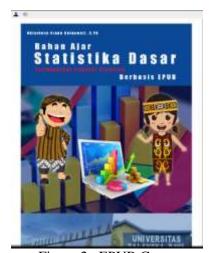

Figure 2. EPUB Cover

Figure 3. Material Display in EPUB

Figure 4. Evaluation Results in the EPUB

Description of Implementation (*Implementation*)

To become a proper learning media, it is necessary to conduct field trials. In this case, the researcher conducted a limited trial on 10 VII semester students and 10 III semester students. Limited trials were conducted outside of lecture hours. Furthermore, the e-module was revised based on the trial results.

Description of Final Evaluation (*Evaluation*)

The results of the validation of the instructional materials developed:

Table 1. EPUB Validation Result

Validator	Validation result
Material expert I	87,50
Material expert II	88,20
Media expert I	83,33
Media expert II	85,60
Mean	**86,15**

From the table above, on average, material experts and media experts were 86.15 in very feasible category. Thus, the EPUB has very suitable criteria to be used and corrected according to suggestions, EPUB can be used as a support for student learning processes that can be used independently.

Figure 5. answers of student related to statistical literacy

Furthermore, it was strengthened by the results of interviews with lecturers as learning implementers using EPUB, it was concluded that the EPUB developed had the potential to increase student statistical literacy and could be applied to other subjects.

Table 2. Results of the Pretest-Posttest Descriptive Analysis of UPR Students for the Experiment Class and the Control Class

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Eksperimen	31	45	77	63.52	8.160
Post-Test Eksperimen	31	70	94	84.23	5.824
Pre-Test Kontrol	22	40	70	59.23	8.502
Post-Test Kontrol	22	45	72	61.23	7.764
Valid N (listwise)	22				

Table 3. Results of the UPR Student Pretest-Posttest Normality Test for the Experiment Class and the Control Class

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Kelas	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Literasi Statistis Mahasiswa	Pre-Test Eksperimen (EPUB)	.136	31	.154	.961	31	.302
	Post-Test Eksperimen (EPUB)	.101	31	.200[*]	.962	31	.334
	Pre-Test Kontrol (Non EPUB)	.161	22	.145	.931	22	.126
	Post-Test Kontrol (Non EPUB)	.119	22	.200[*]	.930	22	.122

Based on the output above, a significance value (Sig.) was obtained for all data both in the Kolmogorov-Smirnov test and the Shapiro-Wilk test> 0.05. It means that the research data was normally distributed.

Table 4. Results of Paired Sample T-Test Pretest-Postest UPR Students Experiment Class and Control Class

		Paired Differences							
			Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean			Lower	Upper			
Pair 1	Experiment of Pre-Test - Post-Test	-20.710	7.431	1.335	-23.435	-17.984	-15.518	30	.000
Pair 2	Pre-Test control - Post-Test	-2.000	4.265	.909	-3.891	-.109	-2.199	21	.039

Based on the output of Pair-1, it was obtained a significant value (Sig.) of 0.000 <0.05. It can be concluded that there was a difference in the average pretest-posttest results of students for the pretest experiment class and the posttest experiment class. Based on the output of Pair-2, it was obtained a significant value (Sig.) of 0.039 <0.05. It can be concluded that there was a difference in the average pretest-posttest results of students for the control class pretest and the control class posttest. Based on the discussion of the output of Pair-1, it can be concluded that there was an effect of learning using EPUB on the results of students' pretest-posttest.

Table 5. Descriptive Statistical Results Paired Sample T-Test Pretest-Posttest UPR Students Experiment Class and Control Class

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experiment Pre-Test	63.52	31	8.160	1.466
	Experiment Post-Test	84.23	31	5.824	1.046
Pair 2	Control Pre-Test	59.23	22	8.502	1.813
	Control Post-Test	61.23	22	7.764	1.655

Based on the table above, the average of the experiment class pretest was 63.52 and the experiment class posttest was 84.23. It means that there was an increase in the pretest and posttest results of the experiment class by 20.71. In other words, EPUB could improve the results of students' statistical literacy tests. Whereas in the control class, the average of the control class pretest was 59.23 and the control class posttest was 61.23. In other words, there was an increase in the statistical literacy results of students taught without EPUB but only an increase of 2. Thus, based on the analysis, it can be concluded that there was a significant difference in statistical literacy results between the experiment class and the control class at Universitas Palangkaraya.

Table 6. Homogeneity Test of UPR Student Posttest Results for Experiment Class and Control Class

		Levene Statistic	df1	df2	Sig.
Results of Student's Statistical Literacy	Based on Mean	1.723	1	51	.195
	Based on Median	1.811	1	51	.184
	Based on Median and with adjusted df	1.811	1	47.548	.185
	Based on trimmed mean	1.747	1	51	.192

Based on the output above, a significant value (Sig.) Based on Mean was 0.195> 0.05. Thus, it can be concluded that the data variance/diversity of the experiment class post-test data and the control class post-test data was the same or homogeneous. Hence, one of the requirements (not absolute) of the independent sample t-test had been fulfilled.

Table 7 Result of N-Gain Score Test for UPR Students for Experiment Class and Control Class

No	Experiment class N-Gain Score (%)	No	Control class N-Gain Score (%)
1	71.43	1	.00
2	43.33	2	5.88
3	68.00	3	-21.21
4	60.61	4	8.33
5	35.71	5	-11.11
6	43.75	6	5.88
7	71.05	7	.00
8	62.50	8	-9.38
9	74.36	9	6.67
10	34.78	10	4.76
11	44.44	11	.00
12	51.11	12	5.00
13	50.00	13	14.29
14	54.55	14	6.67
15	55.88	15	10.00
16	40.00	16	4.76
17	60.00	17	10.00
18	55.56	18	10.00
19	76.00	19	.00
20	80.00	20	6.67
21	40.00	21	30.00
22	75.00	22	6.25
23	71.43		
24	43.33		
25	68.00		
26	60.61		
27	35.71		
28	43.75		
29	71.05		
30	62.50		
31	74.36		
Mean	56,2761	Mean	4,2482
Minimum	26,47	Minimum	-21,21
Maximum	80,00	Maximum	30,00

Based on the results of the calculation of the N-gain score test, it showed that the average N-gain score for the experiment class was 56.2761 or 56.3%. Based on the category table of the interpretation of the effectiveness of the N-Gain value (%), it can be concluded that the use of EPUB was quite effective for use in integrated statistical learning of statistical literacy. Furthermore, it was known that the average N-gain score for the control class was 4.2482 or 4.24%. So, based on the category table of the interpretation of the effectiveness of the N-gain value (%), it can be concluded that the integrated statistics learning of statistical literacy without EPUB was not effective. it can be statistically considered

that there is a difference in effectiveness between integrated statistical learning using EPUB and integrated statistics learning without using EPUB.

Table 8. Independent Sample T-Test Posttest Student UPR Experiment Class and Control Class

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Results of Student's Statistical Literacy	Equal variances assumed	1.723	.195	12.330	51	.000	22.999	1.865	19.254	26.743
	Equal variances not assumed			11.746	36.990	.000	22.999	1.958	19.031	26.966

Based on the output above, a Sig (2-talled) of 0.000 <0.05 (referring to the Equal variances assumed) was obtained because the previous calculation showed that the data were homogeneous). It can be concluded that there was a significant (real) difference between the statistical literacy results of students who using EPUB and not using EPUB.

Table 9. Descriptive Results of UPR Student Posttest T-Test for Experiment Class and Control Class

	class	N	Mean	Std. Deviation	Std. Error Mean
Results of Student's Statistical Literacy	Posttest-experiment class (EPUB)	31	84.23	5.824	1.046
	Posttest-control class (Non EPUB)	22	61.23	7.764	1.655

Based on the output above, the average posttest of the experiment class was 84.23, while the posttest of the control class was 61.23. Thus, the posttest results of the experiment class were higher than the posttest results of the control class with a difference of 23 and this result was a significant difference between the posttest of the experiment class and the posttest of the control class.

Table 10. Results of the Pretest-Posttest Descriptive Analysis of UPR Students for the Experiment Class and the Control Class

	N	Minimum	Maximum	Mean	Std. Deviation
Experiment Pre-Test	22	35	76	57.91	10.075
Experiment Post-Test	22	68	93	78.14	6.453
Control Pre-Test	19	45	72	58.68	8.021
Control Post-Test	19	48	75	63.00	7.550
Valid N (listwise)	19				

Table 11. Results of the UPR Student Pretest-Posttest Normality Test for the Experiment Class and the Control Class

	Kelas UMPR	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Results of UMPR Statistical Literacy	1	.114	22	.200[*]	.967	22	.650
	2	.145	22	.200[*]	.959	22	.473
	3	.165	19	.185	.937	19	.237
	4	.181	19	.103	.944	19	.315

Based on the output above, a significance value (Sig.) was obtained for all data both in the Kolmogorov-Smirnov test and the Shapiro-Wilk test> 0.05. It means that the research data distributed were ***normal.***

Table 12. Result of Paired Sample T-Test Pretest-Posttest UPR Students Experiment Class and Control Class

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experiment Pre-Test – experiment Post-Test	-20.227	8.880	1.893	-24.164	-16.290	-10.684	21	.000
Pair 2	Control Pre-Test-Control Post-Test	-4.316	5.898	1.353	-7.158	-1.473	-3.190	18	.005

Based on the output of Pair-1, it was obtained a significant value (Sig.) of 0.000 <0.05. It can be concluded that there is a difference in the average pretest-posttest results of students for the pretest experiment class and the posttest experiment class. Based on the output of Pair-2, it was obtained a significant value (Sig.) of 0.005 <0.05. It can be concluded that there was a difference in the average pretest-posttest results of students for the control class pretest and the control class posttest. Based on the discussion of the output of Pair-1, it can be concluded that there is an effect of learning using EPUB on the results of students' pretest-posttest.

Table 13. Results of Descriptive Statistics of Paired Sample T-Test Pretest-Posttest Test of UMPR Students Experiment Class and Control Class

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experiment Pre-Test	57.91	22	10.075	2.148
	Experiment Post-Test	78.14	22	6.453	1.376
Pair 2	Control Pre-Test	58.68	19	8.021	1.840
	Control Post-Test	63.00	19	7.550	1.732

Based on the table above, the average of the experiment class pretest was 57.91 and the experiment class posttest was 78.14. It means that there was an increase in the pretest and posttest results of the experiment class by 20.23. In other word, EPUB could improve the results of students' statistical literacy tests. Whereas, in the control class, the average of the control class pretest was 58.68 and the

control class posttest was 63.00. In other words, there was an increase in the statistical literacy results of students taught without EPUB but only an increase of 4.32. Thus, based on the analysis that has been described, it can be concluded that there is a significant difference in the results of statistical literacy between the experiment class and the control class at the Universitas Muhammadiyah Palangkaraya.

Table 14. Homogeneity Test of UMP Student Posttest Results for Experiment Class and Control Class

		Levene Statistic	df1	df2	Sig.
Literacy Results UMPR statistics	Based on Mean	1.172	1	39	.286
	Based on Median	.574	1	39	.453
	Based on Median and with adjusted df	.574	1	36.233	.454
	Based on trimmed mean	1.266	1	39	.267

Based on the output above, a significant value (Sig.) based on Mean was $0.286 > 0.05$. Thus, it can be concluded that the variance of the data/diversity of the post-test data of the experiment class and the post-test data of the control class was the same or homogeneous. Thus, one of the requirements (not absolute) of the independent sample t-test had been fulfilled.

Table 15. Results of the N-Gain Score Test for UMPR Students for the Experiment Class and the Control Class

No	Experiment class N-Gain Score (%)	No	Control class N-Gain Score (%)
1	56.00	1	6.67
2	66.67	2	27.27
3	52.31	3	.00
4	52.17	4	.00
5	35.71	5	12.50
6	38.78	6	-5.00
7	37.50	7	-10.53
8	70.83	8	13.33
9	46.34	9	6.25
10	41.82	10	5.45
11	56.00	11	44.44
12	34.38	12	12.50
13	86.67	13	22.73
14	72.50	14	7.14
15	73.91	15	8.89
16	55.56	16	-5.26
17	46.67	17	9.52
18	94.12	18	11.11
19	60.00	19	18.18
20	55.56	20	
21	26.67	21	
22	70.00	22	
Average	55,9158	Average	9,7478
Minimum	26,67	Minimum	-10,53
Maximum	94,12	Maximum	44,44

Based on the results of the calculation of the N-gain score test, it showED that the average N-gain score for the experiment class WAS 55.9158 or 56%. Based on the category table of the interpretation of the effectiveness of the N-Gain value (%), it can be concluded that the use of EPUB WAS quite effective for use in integrated statistical learning of statistical literacy. Furthermore, it WAS known that the average N-gain score for the control class WAS 9.7478 or 10%. Thus, based on the category table of the interpretation of the effectiveness of the N-gain value (%), it can be concluded that the integrated statistical learning of statistical literacy without EPUB was ineffective. So it can be considered that there was a difference in effectiveness between integrated statistical learning using EPUB and integrated statistics learning without using EPUB.

Table 16. Independent Sample T-Test Posttest Student UPR Experiment Class and Control Class

		Levene's Test for Equality of Variances		t-test for Equality of Means						
			Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									ower	Upper
Results of UMPR Statistical Literacy	Equal variances assumed	1.172	.286	6.923	39	.000	15.136	.186	0.714	19.559
	Equal variances not assumed			6.843	35.700	.000	15.136	.212	0.649	19.624

Based on the output above, a Sig (2-talled) of 0.000 <0.05 (referring to the Equal variances assumed) was obtained because the previous calculation showed that the data was homogeneous). It can be concluded that there was a significant (real) difference between the statistical literacy results of students who used EPUB and not used EPUB.

Table 17. Descriptive Results of UPR Student Postest T-Test for Experiment Class and Control Class

	Class	N	Mean	Std. Deviation	Std. Error Mean
Results of UMPR Statistical Literacy	Experiment Post-Test_ (EPUB)	22	78.14	6.453	1.376
	Control Post-Test (Non EPUB)	19	63.00	7.550	1.732

Based on the output above, the average posttest of the experiment class was 78.14 while the posttest of the control class was 63.00. Thus, the posttest results of the experiment class were higher than the posttest results of the control class with a difference of 15.14 and this result was a significant difference between the posttest of the experiment class and the posttest of the control class.

This results were inline with research conducted by (Taqriduan & Wibawa, 2019). It showed that the learning outcomes of class students using EPUB assisted web learning media were quite better than those using conventional learning models. Furthermore, similarities also occurred in the results of research by (Maulindah et al., 2017). It showed that the average score of students after using EPUB had increased. Another evidence by (Islamy et al., 2020) with research results of 72%, a posttest increase was affected by the successful use of EPUB instructional materials.

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Student responses to EPUB instructional materials were in a positive category with results> 70. It means they are in the very practical category and are reinforced by the results of student interviews which stated that EPUB was very helpful in understanding the material even during a pandemic or online learning and the existence of EPUB was very helpful in independent learning and EPUB is very interesting. This was in line with the results of research by (Beal & Rosenblum, 2018), it showed that students answered more math problems correctly while using the EPUB application. Overall, teachers reported that their students were more motivated by the application than with their traditional media literacy. Furthermore, the results of research by (Hidayat et al., 2017) EPUB with the epub format were more dynamic than other formats because the size of the text, page numbers, images and paragraphs always adjusted to the screen of the device used by the reader.

Conclusion and Suggestion

Based on the results of the research, it was found that the EPUB instructional materials integrated with statistical literacy are in the very valid category and they have passed 4 validators, who were competent in their fields with an average validation result of 86.15. Furthermore, in terms of effectiveness, EPUB instructional materials fall into the very practical category in terms of implementation, lecturer and student responses, pretest and posttest results. It indicates that individual scores are in the criteria for grades B + to A. In terms of practicality, EPUB instructional materials are in very practical category based on the results of the student response questionnaire which all aspects reach> 70 and all quantitative results have been supported by the results of interviews with both students and lecturers.

The suggestion that the writer can give to the further researcher is that in developing EPUB instructional materials, researchers should master programming languages such as html5, css, xhtml, and xml. EPUB instructional materials can also be adapted for other subjects and subjects, from elementary to tertiary level. Even though the EPUB instructional materials in this research have been carried out by 4 validators and trials, it would be better to conduct extensive trials.

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