THE IMPLEMENTATION OF IBM SPSS LEARNING MEDIA ON STUDENTS' CREATIVE THINKING ABILITIES

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ABSTRACT

The aim of this research is to determine the effect of IBM SPSS learning media on students' creative thinking abilities in analyzing simple linear regression in the Statistics course. The benefit of this research is to provide knowledge about the influence of IBM SPSS learning media on creative thinking abilities. This research was carried out in the Airport Management Study Program Diploma III class Alpha and Bravo. The research design used was quantitative research with survey methods. The independent variable is the use of IBM SPSS, while the dependent variable is the ability to think creatively. The sampling technique used a total sampling of 48 students. Data processing uses IBM SPSS series 26 software. Instrument test with valid and reliable results. The classical assumption test meets the norm, is free from heteroscedasticity, and has a linear model. Test the hypothesis with a significant value of 0.000 > 0.05, then H0 is rejected and Ha is accepted with the regression equation Y= 6.866+0.764x. The conclusion from this research is that there is an influence of using IBM SPSS on the development of creative thinking skills in analyzing simple linear regression

Keywords: creative thinking, IBM SPSS, influence

1. INTRODUCTION

Statistics is one of the most important courses in higher education, especially for students in various majors such as economics, social, health, and science. This course provides a fundamental understanding of how data is collected, analysed and interpreted to make evidence-based decisions. One of the fundamental topics in statistics is simple linear regression [1], which aims to examine the connection between one independent variable and one dependent variable. This topic provides an important foundation for students in understanding more complex data analysis techniques later on.

However, the main challenge in learning statistics often arises due to the theoretical and technical nature of the material being taught. Many students only understand linear regression as a mathematical calculation procedure [2], without realising the deeper implications of the analysis results. This impacts the development of their critical and creative thinking skills, which should be the focus of the learning process.

Creative thinking relates to the ability to generate innovative solutions or approaches in data analysis.

This is where the role of technology has a very important role [3]. This is where the role of technology, such as IBM SPSS (Statistical Package for the Social Sciences), becomes very relevant. As a popular statistical software, IBM SPSS provides students with access to more in-depth and efficient data analysis, including simple linear regression analysis [4]. Utilizing applications in education can alleviate the need for manual calculation [5]. Using an application in learning can minimize the necessity for manual computations, so that students can focus more on the aspects of analysis, evaluation, and application of statistical results. Thus, the use of IBM SPSS has great potential to improve students' critical and creative thinking skills in analysing simple linear regression.

Some students often perceive statistics courses as complicated and uninteresting [6]. This is mainly due to the learning approach that focuses on teaching mathematical formulas and manual calculation

techniques. In reality, statistics is not only about the calculation of numbers, but also about how to formulate hypotheses, interpret data, and make the right decisions based on empirical evidence.

In the context of simple linear regression analysis, students are often only directed to complete calculations using the formulas they are taught, without being encouraged to explore a deeper understanding. Students tend to focus on the end result, the regression coefficient, without fully comprehending the significance of the relationship between independent and dependent variables.. As a result, they are less trained to think critically about the results obtained or to develop creative ideas in interpreting the analysis results that are more relevant in the context of real problems.

IBM SPSS provides a solution to this problem by providing a tool that not only simplifies the calculation process, but also assists students in data visualisation, model assumption testing, and interpretation of regression results. Using SPSS allows students to see a broader picture of the regression analysis process, including how variables interact and how conclusions can be drawn from the analysed data. In addition, the software provides comprehensive and detailed statistical reports, which can be used to encourage students to develop new ideas related to their analysis results. Learning challenges are also influenced by a lack of adequate study time [7].

In learning statistics, especially in the topic of simple linear regression, the use of IBM SPSS will not only make it easier for students to complete their assignments, but will also provide space for them to innovate and think critically in every step of their analyses. The use of SPSS allows students to interact with data more dynamically, understand emerging patterns, and develop more rigorous and data-driven hypotheses. IBM SPSS is one of the software that is often used to manage and analyse data. [8].

The capacity for critical and creative thinking is a highly valuable skill in today's information age [9]. Students with strong creative thinking abilities can assess information impartially, analyze evidence, and make informed decisions grounded in data. Meanwhile, the ability to think creatively allows them to find new or alternative solutions in solving problems. Both of these abilities are needed in statistical analysis, especially in understanding the concepts underlying the relationship between variables in simple linear regression.

However, many students have difficulty in developing this thinking ability when faced with manual data analysis tasks. They tend to follow the steps of calculations without understanding how the results can be interpreted or related to real problems. The use of

IBM SPSS can help students overcome this obstacle by providing intuitive analytical tools and simplifying the data interpretation process [10].

Students who use this software tend to be faster in understanding the concepts of statistical analysis [11]. This is because they can focus on analysing the data in more depth, rather than getting caught up in complicated mathematical calculations. In essence, SPSS enables students to engage in more critical and creative thinking during the data analysis process, particularly in grasping the concept of simple linear regression.

Creative thinking skills can be honed by giving questions that refer to aspects of creative thinking [12]. Meanwhile, creative thinking skills can be enhanced through the use of SPSS by motivating students to explore alternative models or methods that are better suited for data analysis. With visualisations provided by SPSS, such as scatterplots and residual plots, students can be creative in exploring data and looking for patterns that may not be visible from manual calculations. This can open up opportunities for them to develop new hypotheses or alternative solutions in the interpretation of results.

Although IBM SPSS is frequently used in many universities in the teaching of statistics, few studies have explored the specific impact of using this software on the development of students' creative thinking skills, particularly in the context of simple linear regression [13], [14], [15]. Thus, this study seeks to address this void by thoroughly examining how employing IBM SPSS can enhance these crucial abilities in students enrolled in statistics classes. This investigation holds significance because the findings are anticipated to offer insights for instructors and educational institutions regarding the efficacy of technology-driven instruction in statistics courses. With a better understanding of the impact of using SPSS, lecturers can design more effective teaching methods that are responsive to students' needs, and create a more interactive and innovative learning environment.

Finally, this research also contributes to the development of a more modern pedagogical approach, which not only emphasises the cognitive aspect (understanding of the material), but also the emotional aspect of the statistics learning process. Thus, students are expected to not only master statistical calculations, but also become individuals who are able to think critically and creatively in solving data-based problems.

In recent decades, the integration of technology in education, including in teaching statistics courses, has grown rapidly. According to constructivist learning theory, students learn more effectively when they actively participate in the learning process [16] and can

connect theory with practice. The use of statistical software, such as IBM SPSS, allows students to actively engage in the collection, analysis and interpretation of data relevant to real-life contexts. This approach is in line with learning theories that emphasise "learning by doing" or learning through hands-on practice.

Technology in statistics learning not only facilitates access to data, but also allows students to directly practice statistical concepts in real-world simulations. For example, through the use of IBM SPSS, students can perform simple linear regression analyses more quickly and accurately, compared to manual calculations [17]. The analysis results presented by SPSS are also easier to interpret thanks to the data visualisation provided by this software. This not only enhances students' understanding of the concepts taught, but also helps them develop the analytical skills required in the professional world. Technology enables lecturers to provide faster assessment and feedback, which is crucial in helping students develop critical and creative thinking skills. In this context, IBM SPSS acts as a tool that can accelerate the learning process and improve the effectiveness of statistics teaching.

Simple linear regression is a foundational statistical method designed to forecast the value of a dependent variable using only one independent variable's value [18]. This technique is often an introduction for students in learning statistical methods [19] such as multiple regression, analysis of variance, and other statistical methods used in quantitative research.

The ability to analyse and understand simple linear regression is very important in statistics education because this concept teaches students to: understand relationships between variables, interpret statistical results, test hypotheses, and develop data-driven solutions. However, although simple linear regression is one of the most fundamental statistical techniques, many students have difficulty in understanding it. This difficulty is often caused by students' lack of analytical skills in relating statistical concepts to real problems. They often get stuck in the calculation procedure, without understanding what the regression model is actually trying to explain.

The use of IBM SPSS in simple linear regression analysis can help overcome this obstacle. With the analytical tools provided by SPSS. Students do not have to worry too much about manual calculation errors [20]. They can focus on understanding the concepts and interpreting the results, which will ultimately improve their critical and creative thinking skills. In the realm of statistics education, it is important to ensure that students not only master statistical techniques mechanically, but also understand how statistics can be applied to answer research questions and solve real problems.

One of the primary objectives of contemporary education is fostering both critical and creative thinking [21]. In the field of statistics, creative thinking involves the ability to develop new approaches or innovative solutions in data analysis.

In the learning process of statistics, critical and creative thinking can be developed through several stages, including: problem identification, selection of appropriate analysis methods, interpretation of results and model evaluation. By integrating SPSS into the learning process, students are encouraged to think more critically at each stage of the analysis. For example, they can evaluate whether the linear relationship between variables is strong enough, or they need to explore other models that are more suitable. This stimulates the creative thinking skills that are needed in research and data analysis jobs.

On the other hand, creative thinking in learning statistics can be developed through further exploration of the data. Using the features of IBM SPSS, students can try different data visualisations, explore new variables, or even test alternative statistical models. This process allows students to find new solutions or more innovative approaches to the statistical problems they face.

This study is anticipated to significantly contribute to the advancement of the statistics curriculum in higher education. In particular, the results of this study can assist lecturers in designing teaching strategies that are more responsive to student needs, especially in developing creative thinking skills. Through the integration of IBM SPSS in statistics learning, it is expected that students are not only able to complete statistical calculations, but can also develop a deeper understanding of the concepts underlying statistical analysis.

Furthermore, this research can also act as a reference for universities and other educational institutions in creating technology-driven training programs. In the digital era, mastering technology such as IBM SPSS is a very important skill for students, both in academic and professional contexts. The use of SPSS can provide relevant practical experience, which will not only enhance students' competence in data analysis, but will also prepare them to face challenges in the world of work.

Students of the Airport Management study programme of the Diploma Three Program at Palembang Aviation Polytechnic who take Statistics courses in semester 6 are 2 classes, each class has 24

students, resulting in a total enrollment of 48 students. The implementation of statistics courses after initial observations found information under students look active and dare to express ideas when processing statistical data using the IBM SPSS application. most students have never operated IBM SPSS for data management. During 16 face-to-face meetings, students seemed enthusiastic in doing assignments and during practical data processing exams. Many of the students did not hesitate to ask questions related to data processing. During the final assignment, it can be seen that students take the title of quantitative research quite a lot, with varied titles and data processing using IBM SPSS. a lot of students' thinking creativity develops by accessing various sources such as books, articles, e-books related to the material taught. This gave the author the impetus to examine the effect of IBM SPSS on students' creative thinking skills.

Research [22] used a survey method and data processing using Manova. The novelty in this research is that the variables raised are the use of IBM SPSS and creative thinking, in addition to data processing using ANOVA. Research [23], [24], [25] in their research examined the impact of educational models on critical thinking skills. The novelty of the author's research is the difference in the independent and dependent variables. Research [26] Investigated how attitudes and project-based learning affect creative thinking capabilities, highlighting the innovation of utilizing IBM SPSS as the independent variable.

The purpose of this study was to determine the effect of using IBM SPSS on the development of creative abilities. The hope of this study is to see how much influence the use of IBM SPSS learning media has on the development of creative thinking skills in MBU Study Program students of Palembang Aviation Polytechnic.

2. METODS

This research employs a quantitative survey design utilizing a cross-sectional approach, where data is collected from respondents at one specific point in time [27]. This study aims to analyse the effect of the independent variable (use of IBM SPSS) on students' creative thinking skills in analysing simple linear regression.

The population in this study were MBU A and B students who had taken Statistics courses at Palembang Aviation Polytechnic. Students who have learned to use IBM SPSS in the statistics course were chosen because they already have experience in using statistical software to analyse simple linear regression.

The sampling technique used is total sampling, which is sampling with certain criteria [28]. Inclusion criteria for this research sample [29] are: (1). students of the MBU study programme who have completed the statistics course, (2) students who have utilized IBM SPSS during their educational experience, (3). students who are willing to complete the research questionnaire. Total sampling is utilized due to the population size being fewer than 100 individuals [30], so the researcher uses a sample like the total population of 48 students. The independent variable is the use of IBM SPSS, while the dependent variable represents creativity in thought processes.
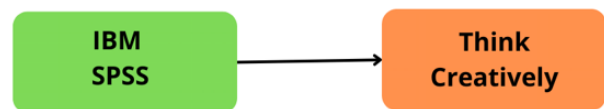
Picture 1. Influence of variables

The instrument used in this research is a questionnaire consisting of several parts. The first part contains the identity of the survey filler in the form of name, age, and gender. the second part is a statement on the use of IBM SPSS which consists of 5 items using a Likert scale of 1-5 [31] (1 = very rarely, 5 = very often). The third part is a statement related to creative thinking ability consisting of 5 items using a Likert scale of 1-5.

The data collection process was conducted through the following steps: (1). The researcher created a questionnaire to assess the validity and reliability of the tool [32]. (2). the survey questionnaire was distributed to the sample through the online method using the Google Forms platform or similar applications [33]. Before filling out the questionnaire, students were given an explanation of the purpose of the study and given information regarding data confidentiality. (3). Questionnaire data were collected and stored for analysis [4]. Only completed and valid questionnaires will be used in data analysis.

The data collected from the survey will be examined using ANOVA. ANOVA is used to test whether there is a significant influence between the use of IBM SPSS on one dependent variable (students' creative thinking skills). ANOVA was chosen because it is able to analyse one independent variable on one dependent variable [34].

The validity of the questionnaire was assessed through content validity by consulting experts in statistics and education. Meanwhile, the reliability of the instrument was tested using Cronbach's Alpha test to ensure the internal consistency of each critical and creative thinking ability scale. The expected alpha value is more than 0.6, which indicates good reliability [35]. A common limitation of survey research is that the

responses given by respondents can be influenced by social biases that make them give answers that are considered 'correct' rather than honest answers [36]. The hypothesis used in this study is:

H0: There is no effect of using IBM SPSS on developing creative thinking skills in analysing simple linear regression.

H1: There is an effect of using IBM SPSS on the development of creative thinking skills in analysing simple linear regression.

The regression equation $Y = a + bX$ [37]

Table 1. Survey grid

NO	Variable Name	Indicator	Item number	Number of items
1	Use of IBM SPSS	Basic Understanding	1	1
		Operating Ability	2	1
		Ability to Use Features	3	1
		Using SPSS in Assignments	4	1
		Confidence in Using SPSS	5	1
2	Creative Thinking	Ability to Generate Alternative Solutions	6	1
		Innovative Use of Statistical Tools	7	1
		Openness to New Approaches	8	1
		Integrating Analysis Results in New Contexts	9	1
		Generating Original Ideas from Data	10	1

3. RESULT

Before the instrument was used, the researcher conducted an instrument test in the form of a validity test and a reliability test to see the suitability of the survey instrument. The statements on the survey consisted of 5 statements related to the use of IBM SPSS and 5 statements related to creative thinking skills. The validity test results are as follows:

Table 2. The validity results of using IBM SPSS

		x1	x2	x3	x4	x5	x TOTAL
x1	PC	1	.501**	.380**	.385**	.448**	.743**
	Sig.		.000	.008	.007	.001	.000
	n	48	48	48	48	48	48
x2	PC	.501**	1	.471**	.426**	.329*	.739**
	Sig.	.000		.001	.003	.022	.000
	n	48	48	48	48	48	48
x3	PC	.380**	.471**	1	.419**	.362*	.713**
	Sig.	.008	.001		.003	.012	.000
	n	48	48	48	48	48	48
x4	PC	.385**	.426**	.419**	1	.583**	.763**
	Sig.	.007	.003	.003		.000	.000
	n	48	48	48	48	48	48
x5	PC	.448**	.329*	.362*	.583**	1	.730**
	Sig.	.001	.022	.012	.000		.000
	n	48	48	48	48	48	48
x TOTAL	PC	.743**	.739**	.713**	.763**	.730**	1
	Sig.	.000	.000	.000	.000	.000	
	n	48	48	48	48	48	48

The data on the validity of the variable use of IBM SPSS obtained significant results from statement 1 to statement 5 with a significant value of 0.000 <0.05, so this instrument is declared valid. This step is in accordance with research [38]

Table 3. Creative thinking ability validity results

		y1	y2	y3	y4	y5	y TOTAL
y1	PC	1	.353*	.496**	.311*	.410**	.688**
	Sig.		.014	.000	.032	.004	.000
	n	48	48	48	48	48	48
y2	PC	.353*	1	.572**	.216	.462**	.710**
	Sig.	.014		.000	.139	.001	.000
	n	48	48	48	48	48	48
y3	PC	.496**	.572**	1	.324*	.559**	.787**
	Sig.	.000	.000		.025	.000	.000
	n	48	48	48	48	48	48
y4	PC	.311*	.216	.324*	1	.479**	.652**
	Sig.	.032	.139	.025		.001	.000
	n	48	48	48	48	48	48
y5	PC	.410**	.462**	.559**	.479**	1	.815**
	Sig.	.004	.001	.000	.001		.000
	n	48	48	48	48	48	48
y TOTAL	PC	.688**	.710**	.787**	.652**	.815**	1
	Sig.	.000	.000	.000	.000	.000	
	n	48	48	48	48	48	48

The data on the validity of the creative thinking ability variable obtained significant results from statement 1 to statement 5 with a significant value of 0.000 <0.05, so this instrument is declared valid. This is in accordance with[39]

Table 4. Reliability Test

Variables	Cronbach's Alpha
Use of IBM SPSS	0.790
Creative thinking skills	0.777

From table 4, the results of data processing with a CA value of 0.790 for the variable use of IBM SPSS and 0.777 for the creative thinking ability variable. The data states that both variables are reliable, so they can be used for research instruments. This step is in accordance with [40]

Table 5. Normality Test

Total	48
Significant	0.064

The amount of data is 48 with the Kolmogorov Smirnov test getting a significant value of 0.064> 0.05, so the data is normally distributed. In line with research [41]

Table 6. Heteroscedasticity Test

	Model	B	SE	Beta	t	sig
1	(Constant)	1.296	0.724		1.789	0.080
	x	-0.027	0.034	-0.117	-.797	0.429

Data processing using IBM SPSS series 26 according to table 6 obtained a significant value of 0.429> 0.05, so the data passed heteroscedasticity. In line with research [42]

Table 7. Linear Test

			df	MS	Sig.
Creative thinking skills* Use of IBM SPSS	BG	C	10	20.530	0.000
		L	1	198.798	0.000
		DFL	9	0.722	0.691
	WG		37	1.010	
	Total		47		

The linear test in table 4 obtained a significant value of 0.691> 0.05, so the data has a linear model. In accordance with research [43]

Table 8. Hypothesis Test

Model		B	SE	Beta	t	sig
1	(Constant)	6.866	1.115		6.159	0.000
	x	0.764	0.764	0.905	.905	0.000

The significant value in table 8 of 0.000 is below the threshold of 0.05, resulting in H0 being rejected and Ha being accepted. The regression equation is Y = 6.866 + 0.764x. In line with research [44]

Table 9. Sumarry

Model	R	R Square	A.R. Square	Std. error
1	.905ᵃ	0.819	0.815	0.977

To see the amount of influence in table 10, the R Square value is 0.819, which means that the contribution of the influence of the variable use of IBM SPSS on creative thinking ability is 81.9%. For 18.1% not examined in this study.

4. DISCUTION

Through the Pearson correlation test technique, it was found that the significance value for the five statements of the variable on the use of IBM SPSS was 0.000 and the five statements of the variable on creative thinking ability was also 0.000. This figure shows that the p value is smaller than the significance level generally set in research, which is 0.05. A p value smaller than 0.05 indicates that the relationship between each statement and the total score is statistically significant [45]. This means that each statement has a strong relationship with the whole instrument, and thus is considered capable of measuring the concept to be measured. If the p value of an item is greater than 0.05, then the item is considered invalid, because it does not have a significant relationship with the variable being measured. The conclusion of this analysis provides assurance that the instrument used is of good quality. This is important because without a valid instrument, the research results will be inaccurate or biased, potentially undermining the entire research process. Therefore, this step of the validity test provides a strong foundation to proceed with the research with confidence that the data collected is accurate and reliable.

In every quantitative research, instrument reliability is one of the most important aspects to ensure. Reliability serves to measure the consistency of an instrument in measuring the variables to be studied. An instrument can be said to be reliable if it is able to provide consistent results when used repeatedly under the same conditions. One method that is often used to measure instrument reliability is Cronbach's Alpha (CA). Cronbach's Alpha calculates the correlation between items in an instrument to ascertain whether the items have alignment in measuring the same variable. The CA threshold value used is 0.6 [46]. The CA value of 0.790 for the variable use of IBM SPSS is in the high reliability category. This means that the items used in the questionnaire to measure the use of IBM SPSS have very good consistency. This indicates that the instrument used provides stable and reliable results in measuring this variable. With a value close to 0.8, this instrument has an almost very high level of reliability, indicating that each item in the questionnaire consistently measures aspects related to the use of IBM SPSS. The CA value of 0.777 for the creative thinking ability variable is also in the high reliability category, although slightly lower than the IBM SPSS usage variable. However, this value still indicates that the instrument is quite consistent in measuring creative thinking ability. Creative thinking ability is a more abstract and subjective aspect than the use of technology, so getting a Cronbach's Alpha value close to 0.8 indicates that this instrument is strong enough and reliable enough to measure this variable. In line with research [47].

Before entering the hypothesis test, the classical assumption test is carried out in the form of normality test, heteroscedasticity test, and linear test. From the Kolmogorov-Smirnov test on 48 data, a significance value of 0.064 was obtained, which is greater than 0.05. This indicates that the data is normally distributed, and the assumption of normality can be considered fulfilled. Thus, the data is ready to be analysed using parametric statistical tests, which allows for more accurate and reliable analysis results. The normality of this data provides the researcher with a strong foundation for conducting various further analyses with the confidence that the data used fulfils the required distribution assumptions. In line with [48].

The heteroscedasticity test results which provide a significance value of 0.429> 0.05 indicate that the data passes the heteroscedasticity test. This means that the residual variance in the regression model is constant, and there is no indication of heteroscedasticity. By passing this test, the regression model is considered valid and fulfils the assumption of homoscedasticity, so researchers can continue the regression analysis without worrying about bias in the coefficient estimation or prediction accuracy. These results provide a strong basis for conducting further analyses or applying the regression model to the prediction of the dependent variable in the future. In line with research [49].

The linearity test results which provide a significance value of 0.691 indicate that the data has a linear model, because the significance value is greater than 0.05. This means that the relationship between the

independent and dependent variables can be expressed linearly, so researchers can continue the analysis using a linear regression model. The linearity of this data ensures that the relationship between variables is quite simple and can be explained in the form of a straight line, which facilitates the interpretation and validity of predictions of regression analysis results. In line with research [50].

After the classification assumption test is fulfilled, hypothesis testing is continued. The results of the hypothesis test show that the significant value obtained is 0.000 less than 0.05, which means that H0 is rejected and Ha is accepted, meaning that there is an effect of using IBM SPSS on the development of creative thinking skills in analysing simple linear regression. The regression equation Y = 6.866 + 0.764x which means Intercept (Constant) = 6.866: Intercept is the initial value of Y when the value of X is equal to 0. In this case, when there is no influence of the independent variable (X = 0), the predicted value of the dependent variable (Y) is 6.866. This describes the base value or initial position of Y before variable X affects the change. Regression Coefficient = 0.764: This regression coefficient illustrates how much influence the independent variable (X) has on the dependent variable (Y). Every one unit change in X will result in an increase of 0.764 in Y. Since the regression coefficient is positive, it indicates that the relationship between X and Y is positive. In other words, when the value of X increases, the value of Y will also increase proportionally. This shows that an increase in the IBM SPSS usage variable will have a direct impact on the creative thinking ability variable according to the coefficient set. In line with [51], [52], [53]

Overall, the R Square value of 0.819 indicates that the variable use of IBM SPSS contributes a significant influence on creative thinking skills with a percentage of 81.9%. This confirms the importance of technology utilisation in the context of developing creative thinking skills. Meanwhile, 18.1% of the unexamined variation emphasises that there are still other factors that need to be explored in future research to get a more comprehensive picture of the factors that influence creative thinking skills. Further research can explore these variables to broaden our understanding of the complexity of creativity in educational and professional contexts.

5. CONCLUSIONS

Based on the results of the hypothesis carried out, a significant value of 0.000 is smaller than the threshold of 0.05 which results in H0 being rejected and Ha being accepted, so that there is an effect of using IBM SPSS on the development of creative thinking skills in analysing simple linear regression. The regression equation Y = 6.866 + 0.764x which means that every 1% increase in the variable use of IBM SPSS, the ability to think creatively will increase by 0.764. The amount of contribution of the influence of the variable use of IBM SPSS on the ability to think creatively is 81.9%.

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