

# Design Thinking as a Predictor of Adaptive Learning and Social Well-Being among in-School Adolescents in Secondary Schools in Rivers State, Nigeria

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## ABSTRACT

The study investigated design thinking as a predictor of adaptive learning and social well-being among in-school adolescents in secondary schools in Rivers State, Nigeria. Four research questions and four corresponding hypotheses guided the study. The study adopted a correlation research design with a population of 1499 students identified with maladaptive learning and poor social well-being. The sample size of the study is 149 students with maladaptive learning and poor social well-being representing 10% of the population drawn through simple random sampling technique. Three instruments titled Design Thinking Questionnaire (DTQ) and Adaptive Learning Questionnaire (ALQ) and Social Well-being Questionnaire (SWQ) respectively. The instruments were face validated by three experts. The internal consistency reliability coefficients of 0.78, 0.89 and 0.85 were computed for DTQ, ALQ and SWQ through Cronbach alpha. Linear regression was used to answer the research questions while t-test associated with linear regression was used to test the null hypotheses at 0.05 level of significance. It was found that creative problem-solving predicted adaptive learning and social well-being of in school adolescents in secondary schools in Rivers State to a very high extent. It was revealed that creative confidence predicted adaptive learning and social well-being of in school adolescents in secondary schools in Rivers State to a very high extent. It was recommended among others that teachers should make the instructional content and activities to be practically oriented in order to enhance adaptive learning and social well-being of in-school adolescents.

**Keywords:** Design Thinking (creative problem-solving), adaptive learning and social well-being

## INTRODUCTION

Adaptive learning and social challenges are presumed to be contemporary issues bedeviling the secondary education system. Adaptive learning can be seen as a teaching method that channels teaching and learning approaches to inclusively integrate the learners into the learning processes. Adaptive learning is such that everyone in the learning environment especially the classroom comprehends and conceptualizes the learning contents. In the view of Onwuzurike (2023), adaptive learning is a teaching method that is necessary for active learning engagement in an organized classroom setting. Similarly, Uduaku (2023) defined adaptive learning as a method that addresses each student's learning need in a class of many students. Adaptive learning is a form of interactive learning which handles the needs of students using learning paths, routine feedback, and necessary instructional aids to overcome one-size-fits-all curriculum (Kurt, 2021).

The importance of adaptive learning in the realization of the goals and objectives of education cannot be overemphasized. It is worthy to note that adaptive learning is a form of supportive learning necessary for teaching and learning effectiveness. According to Rachmad (2022), adaptive learning involves personalization and

flexibility in the learning process in order to realize the instructional objectives. According to McGuire (2021), adaptive learning is capable of helping the students record huge successful especially in their level of mastery and self-directed pace. Adaptive learning can draw students' attention to the learning processes thereby facilitating learning outcomes and instructional content coverage (Ling, 2022). In the same vein, adaptive learning can making learning students centered according their pace and needs (Wang et al., 2020). Adaptive learning is a type of personalized learning that enables students to be properly engaged in the learning processes (Smit & Humpert, 2012). It is empirically proven that adaptive learning is significantly associated with students' outcome (Brühwiler & Vogt, 2020). Furthermore, adaptive learning is found to be significant in promoting instructional processes and educational outcomes (Ankrum et al., 2020; Iterbeke et al., 2021).

Adaptive learning, or adaptive teaching, is necessary in the achievement of learning content through self-directed practices and engagements in the learning processes (Storm, 2023). Furthermore, adaptive learning encourages personalization, self-pace, commitment and effective instructional time management. Despite the importance of adaptive learning to the educational sector, it is disheartening to note that most secondary schools especially in Rivers State are devoid of this learning method. It is reported that most students find it difficult to properly adjust academically (Iboka, 2025). Similarly, it was reported that most secondary school students complain of poor instructional delivery processes that negatively impact on their academic achievement (Okolo, 2024). This issue around students' adaptive learning cannot be dissociated from social destabilization in the classroom. Therefore, adaptive learning can be linked to wellbeing of the students especially in their social interactions.

Wellbeing can be seen as a state of stability. The area of stability in this regard is the social disposition of the students called social well-being. Social well-being is the ability to stay in a healthy relationship with others (Ramirez-Duran, 2021). According to Cicognani et al., (2014), social wellbeing entails positive social duties, social balance and social worlds of an individual. In the same vein, Ramirez-Duran (2021) defined social wellbeing as the development and maintenance of positive relationships with others in a given setting. It is reported that most of the teachers suffer from social marginalization.

Research has proven that social health, wellbeing that comes from connection is as important as the bread and liquid we consume for the good of the body (Killam, 2024). Social wellbeing entails positive association with friends, family, and to others within the immediate environment (Yusuf, 2022). Social well-being refers to the extent to which individuals receive the necessary support, warmth, and respect from their social environment (Bolaji, 2022). It is characterized by positive relationships with others, which foster feelings of relaxation, appreciation, love, and effective communication (Sinclair, 2021). Findings from the study conducted by Salehi et al. (2017) revealed that the social well-being status of students was generally unsatisfactory. These findings suggest that challenges related to adaptive learning and social well-being may have significant implications for students' engagement in design thinking processes.

Design thinking is an instructional process that emphasizes the personalization and individualization of learning content, with the aim of inclusively enhancing students' learning experiences. According to Javed (2024), design thinking is a human-centered learning approach that prioritizes the needs of learners in order to generate innovative solutions through effective feedback mechanisms. The application of design thinking in educational settings largely relies on creative problem-solving strategies and the development of creative confidence among students, enabling them to tackle academic and real-life challenges more effectively.

Creative Problem-Solving (CPS) refers to a structured and strategic process that encourages learners to think innovatively and generate novel solutions to challenges, thereby moving beyond conventional or routine methods. According to Boyles (2022), creative problem-solving involves developing new perspectives and innovative ideas that effectively address emerging challenges. In support of this view, Puccio et al. (2020) identified creative problem-solving as a fundamental and essential skill required for personal and professional success in the 21st century. Notably, creative confidence is a critical element embedded within the creative problem-solving process.

Creative confidence refers to the courage and self-assurance to engage in creative thinking and to persist in creativity despite successes or setbacks. It serves as a driving force that fosters and sustains creative thought,

enabling individuals to transform ideas into tangible realities (Lodwick, 2022). In a similar vein, Boldrini (2023) asserted that creative confidence applies a human-oriented approach to solving both immediate and long-term challenges, promoting flexibility and adaptability among learners. The World Design Organization (WDO, 2023) further described creative confidence as the certainty and belief in one's ability to effectively perform assigned responsibilities. Additionally, WDO emphasized that creative confidence inspires learners to cultivate curiosity, explore diverse approaches, and seek solutions to complex tasks, thereby expanding their capacity for innovation and success.

Based on the foregoing review, it is evident that there is a dearth of empirical studies that have specifically examined the predictive influence of design thinking on adaptive learning and social well-being among in-school adolescents, particularly within the context of secondary schools in Rivers State, Nigeria. This gap in the literature necessitates further investigation to provide evidence-based insights into the role of design thinking in fostering adaptive learning strategies and enhancing students' social well-being. Consequently, this study sought to examine design thinking as a predictor of adaptive learning and social well-being among in-school adolescents in secondary schools in Rivers State, Nigeria.

### **Statement of the Problem**

In-school adolescents who enroll in the school's system are supposed to develop skills necessary to help them enhance their adaptive learning approach and also sustain social well-being in the classroom. The reverse appears to be the case of most in-school adolescents in public secondary schools in Rivers State as they find it almost difficult to adjust academically and socially in the school and classroom learning and social activities. These ugly scenarios are very unhealthy in the realization of the lofty goals and objectives of secondary education. These disheartening situations can grossly impact on the in-school adolescents' internal and external examinations. These conditions have persisted irrespective of the fact that qualified teachers formed the population of teachers and the schools have received serious renovations. This condition can be addressed to so many factors which could range from the conventional teacher-centered approach, teachers' preparations to the classroom and the administrative styles. It is presumed that such replete in educational system can be handled through design thinking approach. Therefore, the researchers investigated to ascertain the extent design thinking can predict adaptive learning and social well-being among in-school adolescents in secondary schools in Rivers State, Nigeria.

### **Aim and Objectives of the Study**

The study investigated design thinking as a predictor of adaptive learning and social well-being among in-school adolescents in secondary schools in Rivers State, Nigeria. The study sought to:

1. determine the predictive power of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State
2. ascertain the predictive power of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State
3. find out the predictive power of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State
4. To find out the predictive power of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State

### **Research Questions**

The following research questions raised guided the study

1. What is the predictive power of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State?
2. What is the predictive power of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State?
3. What is the predictive power of creative confidence on adaptive learning of in-school adolescents in

secondary schools in Rivers State

4. What is the predictive power of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State

## Hypotheses

The following hypotheses raised were tested at 0.05 level of significance

1. There is no significant difference in the prediction of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State
2. There is no significant difference in the prediction of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State
3. There is no significant difference in the prediction of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State
4. There is no significant difference in the prediction of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State

## METHODS

The study adopted a correlation research design with a population of 1499 students identified with maladaptive learning and poor social well-being. The sample size of the study is 149 students with maladaptive learning and poor social well-being representing 10% of the population drawn through simple random sampling technique. Three instruments titled Design Thinking Questionnaire (DTQ) and Adaptive Learning Questionnaire (ALQ) and Social Well-being Questionnaire (SWQ) respectively.

Design Thinking Questionnaire (DTQ) is a 20-item instrument that has two sections of A and B. Section A has the demographic information of the respondents such as their age and gender while section B has two clusters. Cluster A has 10 items that elicited responses on creative problem-solving while the second cluster has 10 items that elicited responses on creative confidence. The DTQ was structured to have the response options of Very High Extent (4), High Extent (3), Low Extent (2) and Very Low Extent (1) respectively. The minimum and maximum response scores are 20 and 80 respectively.

The Adaptive Learning Questionnaire (ALQ) is a 10 items instrument that has two sections of A and B. Section A has the demographic information of the respondents such as their age and gender while section B has one cluster. The SWQ was structured to have the response options of Very High Extent (4), High Extent (3), Low Extent (2) and Very Low Extent (1) respectively. The minimum and maximum response scores are 10 and 40 respectively.

The Social Well-being Questionnaire (SWQ) is a 10 items instrument that has two sections of A and B. Section A has the demographic information of the respondents such as their age and gender while section B has one cluster. The SWQ was structured to have the response options of Very High Extent (4), High Extent (3), Low Extent (2) and Very Low Extent (1) respectively. The minimum and maximum response scores are 10 and 40 respectively.

The instruments were face validated by three experts. One expert from the Department of Educational Psychology, Guidance and Counselling University of Port Harcourt and two experts in Measurement and Evaluation in the Department of Science Education, University of Nigeria. Nsukka. The internal consistency reliability coefficients of 0.78, 0.89 and 0.85 were computed for DTQ, ALQ and SWQ through Cronbach alpha. The internal consistency for the clusters of Creative Problem-solving was 0.77 and that of Creative confidence was 0.80 respectively. Linear regression was used to answer the research questions while t-test associated with linear regression was used to test the null hypotheses at 0.05 level of significance.

## RESULTS

**Research question 1:** What is the predictive power of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State?

**Table 1: linear regression of the predictive power of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.82	0.672	0.668	4.09032

0.00 – 0.20 = very low, 0.21 – 0.40 = low, 0.41 – 0.60 = moderate, 0.61 -0.80 = high, 0.81 and above = very high

Data on table 1 shows that the regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) values are 0.820 and 0.672 respectively. This shows that there is a very high positive relationship between creative problem-solving and adaptive learning. Therefore, an increase in creative problem-solving leads to a very high increase in the adaptive learning of in-school adolescents in secondary schools in Rivers State, Nigeria. The coefficient of determinism of 67.2% showed that creative problem-solving has a very high predictive power on adaptive learning of in-school adolescents in secondary schools in Rivers State. The 32.8% variance in adaptive learning of in-school adolescents in secondary schools in Rivers State is not accounted for by creative problem-solving.

**H<sub>01</sub>:** There is no significant prediction of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State

**Table 2: t-test associated with linear regression of the predictive power of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.014	1.032		21.333	.000
	creative problem-solving	.804	.030	.820	13.445	.000

Data on table 2 showed that the t-test value associated with linear regression is 13.445. The hypothesis is rejected because the significant value of 0.00 is less than the alpha value of 0.05. Therefore, there is a significant prediction of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State.

**Research question 2:** What is the predictive power of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State?

**Table 3: linear regression of the predictive power of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State.**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.819 <sup>a</sup>	.671	.670	2.17827

0.00 – 0.20 = very low, 0.21 – 0.40 = low, 0.41 – 0.60 = moderate, 0.61 -0.80 = high, 0.81 and above = very high.

Data on table 3 shows that the regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) values are 0.819 and 0.671 respectively. This shows that there is a very high positive relationship between creative problem-solving and social wellbeing. Therefore, an increase in creative problem-solving leads to a very high increase in the social wellbeing of in-school adolescents in secondary schools in Rivers State, Nigeria. The coefficient of determinism of 67.1% showed that creative problem-solving has a very high predictive power on social wellbeing of in-school adolescents in secondary schools in Rivers State. The 32.8% variance in social

wellbeing of in-school adolescents in secondary schools in Rivers State is not accounted for by creative problem-solving.

**H<sub>02</sub>:** There is no significant difference in the prediction of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State

**Table 4: t-test associated with regression of the predictive power of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.906	1.362		6.539	.000
	creative problem-solving	.751	.039	.819	19.070	.000

Data on table 4 showed that the t-test value associated with linear regression is 19.070. The hypothesis is rejected because the significant value of 0.00 is less than the alpha value of 0.05. Therefore, there is a significant prediction of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State.

**Research question 3:** What is the predictive power of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State?

**Table 5: linear regression of the predictive power of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.905 <sup>a</sup>	.819	.759	4.01832

0.00 – 0.20 = very low, 0.21 – 0.40 = low, 0.41 – 0.60 = moderate, 0.61 -0.80 = high, 0.81 and above = very high

Data on table 5 shows that the regression correlation coefficient (R) and coefficient of determinism (R<sup>2</sup>) values are 0.905 and 0.819 respectively. This shows that there is a very high positive relationship between creative confidence and adaptive learning. Therefore, an increase in creative confidence leads to a very high increase in the social wellbeing of in-school adolescents in secondary schools in Rivers State, Nigeria. The coefficient of determinism of 81.9% showed that creative confidence has a very high predictive power on adaptive learning of in-school adolescents in secondary schools in Rivers State. The 18.1% variance in adaptive learning of in-school adolescents in secondary schools in Rivers State is not accounted for by creative confidence.

**H<sub>03</sub>:** There is no significant difference in the prediction of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State

**Table 6: t-test associated with linear regression of the predictive power of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.251	2.777		6.933	.000
	creative confidence	.973	.080	.905	5.902	.000

Data on table 6 showed that the t-test value associated with linear regression is 5.902. The hypothesis is rejected because the significant value of 0.00 is less than the alpha value of 0.05. Therefore, there is a significant

difference in the prediction of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State.

**Research question 4:** What is the predictive power of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State?

**Table 7: linear regression of the predictive power of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.906 <sup>a</sup>	.821	.795	4.16904

0.00 – 0.20 = very low, 0.21 – 0.40 = low, 0.41 – 0.60 = moderate, 0.61 -0.80 = high, 0.81 and above = very high

Data on table 7 shows that the regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) values are 0.906 and 0.821 respectively. This shows that there is a very high positive relationship between creative confidence and social wellbeing. Therefore, an increase in creative confidence leads to a very high increase in the social wellbeing of in-school adolescents in secondary schools in Rivers State, Nigeria. The coefficient of determinism of 82.1% showed that creative confidence has a very high predictive power on social well-being of in-school adolescents in secondary schools in Rivers State. The 17.9% variance in social well-being of in-school adolescents in secondary schools in Rivers State is not accounted for by creative confidence.

**H<sub>04</sub>:** There is no significant difference in the prediction of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State

**Table 8: t-test associated with linear regression of the predictive power of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	24.050	2.607		9.226	.000
	creative confidence	.835	.075	.906	4.441	.000

Data on table 8 showed that the t-test value associated with linear regression is 4.441. The hypothesis is rejected because the significant value of 0.00 is less than the alpha value of 0.05. Therefore, there is a significant difference in the prediction of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State.

## DISCUSSION OF FINDINGS

The finding showed that creative problem-solving has a very high predictive power on adaptive learning with regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) values of 0.820 and 0.672. The hypothesis showed that there is a significant prediction of creative problem-solving on adaptive learning of in-school adolescents in secondary schools in Rivers State. The finding of this study is expected because creative problem-solving creative problem-solving (CPS) focuses on encouraging students to think outside the box and generate high level of innovative measures in solving problems associated with learning and social adjustments. The finding of this study lends credence to that of Boyles (2022) which reported that creative problem-solving allows learners to use new perspectives, ideas in an innovative way to addressing challenges. In the same vein, the finding of this study corroborated with that of Muin, et al (2018) which reported that creative problem solving enhances students' adaptive reasoning. Similarly, the finding of this study agreed with that of Irianto, et al (2020) which showed that there was a significant increase in the students' ability to initiate creative thing in learning.

The finding of this study is consistent with that of Rubenstein, et al (2020) which showed that creativity is associated with problem identification strategies.

The finding showed that creative problem-solving has a very high predictive power on social well-being of in-school adolescents with regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) are 0.906 and 0.821. The hypothesis showed that there is a significant prediction of creative problem-solving on social well-being of in-school adolescents in secondary schools in Rivers State. The finding of this study has shown that an increase in creative problem-solving is a strong determinant of social wellbeing among students. Students who have their creative problem-solving skills developed are more likely to record social stability in the school system. The finding of this study buttressed that of Puccio, et al (2020) which submitted that creative problem-solving has been identified as a necessary and fundamental skill needed for success. Similarly, the finding of this study supported that of Suryanto, et al (2021) that creative problem solving is a significant intervention social skill on the performance of creative tasks. In the same vein, the finding of this study is in tandem with that of Arfandi, et al (2023) which showed that creative problem-solving educational models have strong impact on students' wellbeing and ability to think creatively.

The finding showed that creative confidence has a very high predictive power on adaptive learning of in-school adolescents in secondary schools in Rivers State because the regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) values are 0.819 and 0.671 respectively. The hypothesis showed that there is a significant prediction in the prediction of creative confidence on adaptive learning of in-school adolescents in secondary schools in Rivers State. The finding of this study has shown that creative confidence is required for the students to properly adapt in every learning situation. The finding of this study is in tandem with that of Loughland (2019) which showed that adaptive teaching for students' is critical in creative thinking ability. In the same vein, the finding of this study is in line with that of Alvarez-Huerta, et al (2021) which revealed that student engagement is necessary for creative confidence.

The finding showed that creative confidence has a very high predictive power on social well-being of in-school adolescents in secondary schools in Rivers State because the regression correlation coefficient (R) and coefficient of determinism ( $R^2$ ) values are 0.906 and 0.821 respectively. The hypothesis showed that there is a significant prediction of creative confidence on social well-being of in-school adolescents in secondary schools in Rivers State. The finding of this study could be stemming from the fact that creative confidence makes learners to develop courage and resilience, achieving successes and overcoming setbacks. The finding of this study is in agreement with that of Lodwick (2022) which submitted that creative confidence is the key to success in all ramifications. Similarly, the finding of this study supported that of Boldrini (2023) which submitted that creative confidence applies human-oriented approach to address immediate and long-term challenges. The finding of this study is in agreement with that of Fancourt and Steptoe (2019) showed that creativity leads to social and behavioral adjustment. In the same vein, the finding of this study supported that of Jean-Berluche (2024) that creative expression is significant for wellbeing. Similarly, the finding of the study is in agreement with Fiori, et al, (2022) that creativity is associated with higher well-being.

## CONCLUSION

Based on the findings of this study, it was concluded that design thinking in the areas of creative problem-solving and creative confidence are strong predictors of adaptive learning and social well-being of in-school adolescents in secondary schools in Rivers State.

## RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made that:

1. The teachers should make the instructional content and activities to be practically oriented in order to enhance adaptive learning and social well-being of in-school adolescents.
2. The teachers should encourage hands-on and exploratory teaching activities in order to enhance adaptive learning and social well-being of in-school adolescents.

## Limitations

The study was faced with some limitations. The finding of this study is limited to in-school adolescents in public secondary schools in Rivers State. The findings cannot be generalized to private secondary schools in Rivers State, Nigeria. The study also used questionnaire as a means of data collection which may be prone to faking.

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