VALIDATING THE ONLINE PLATFORM (OP), MANAGEMENT MODE (MM), SUPERVISION SYSTEM (SS) AND EVALUATION SYSTEM (ES) ON PEDAGOGICAL QUALITY (PQ) IMPROVEMENT FOR ONLINE ADULT HIGHER EDUCATION USING PLS-SEM APPROACH

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ABSTRACT

This article focuses on the four factors affecting the perceptions of pedagogical Quality (PQ) among adult students. These four factors are Online Platform (OP), Management Mode (MM), Supervision System (SS), and Evaluation System (ES). This study engaged a survey on online adult Higher education learners. The PLS-SEM method was utilized by using Smart-PLS version 4. The findings have confirmed that these four factors, namely Online Platform (OP), Management Mode (MM), Supervision System (SS), and Evaluation System (ES), have positive and significant effects on the perceptions of the pedagogical quality of the students. Therefore, related implications and suggestions are proposed to help enhance the level of the perceptions of pedagogical Quality among the students.

Keywords: *PLS-SEM, Online Platform (OP), Management Mode (MM), Supervision System (SS), and Evaluation System (ES), Pedagogical Quality (PQ)*

INTRODUCTION

The network-based teaching and management model of China's adult higher education teaching reform has taken shape, and adult higher education held by various colleges and universities is gradually realizing online teaching. It has established its network-based teaching management platform. However, while some progress has been made in the network teaching reform of adult higher education, there are still many problems. These online learning problems include the lack of face-to-face interaction and hands-on experience, making it difficult for some learners to stay engaged and motivated (Ozkan & Koseler, 2018). The consequence of not conducting this research would be a lack of understanding of the effectiveness of the online platform, management mode, supervision system, and evaluation system on the pedagogical quality of online adult higher education. This could result in ineffective or suboptimal systems, reducing student engagement, learning outcomes, and satisfaction with the online learning experience. Therefore, this research studies and analyses the current situation of the network construction of adult higher education teaching improvement.

LITERATURE REVIEW

The Pedagogical Quality Improvement (PQ) in online adult higher education management reformation. It is related to improving pedagogical competencies among teachers (Ramlawati et al., 2018).

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While for Online Platform (OP) includes three major aspects: an online course development system, an online teaching system, and an online learning system. This refers typically to the perceptions about the benefits of accessibility to the learning materials and contents provided in the particular online platform used to deliver online learning in the institutions (Cote & Millner, 2015). The ultimate goal is to enhance learning performance.

For Management Mode (MM), comprehensive management methods and methods, including personnel management, system management, etc., have to be taken care of. Management mode refers to the comprehensive management methods and methods that support adult online education, including personnel management, system management, etc. (Kara et al., 2019).

A Supervision System (SS) that online education aligns with the school's policy, is compliant, legal, and on-demand. The supervision system is defined as a system of supervision in online education that aligns with the educational institutions' policy, compliance, legal, and on-demand (Hasri et al., 2021).

Lastly, Evaluation System (ES) evaluates and assesses teaching and learning effects. The evaluation system refers to evaluating and assessing teaching and learning effects under online learning mode (Naibaho, 2020). The ultimate goal is for pedagogical quality improvement.

Research Objective:

To determine how much the online platform, management mode, supervision system, and evaluation system contribute to improving pedagogical quality in online adult higher education.

Research Question:

To what extent do the online platform, management mode, supervision system, and evaluation system affect the improvement of pedagogical quality in online adult higher education?

In sum, there are four research hypotheses in this study. They are:

H1: The online platform will significantly positively affect pedagogical quality improvement in online adult higher education management reformation.

H2: The management mode will significantly positively affect pedagogical quality improvement in online adult higher education management reformation.

H3: The supervision system will significantly positively affect pedagogical quality improvement in online adult higher education management reformation.

H4: The evaluation system will significantly positively affect pedagogical quality improvement in online adult higher education management reformation.

METHODOLOGY

The research design of this study is a quantitative method used in most model validation research. This survey is based study will keep the anonymity and requires the researcher to protect the loss of confidentiality and privacy of the participant. Considering the value of anonymity for the samples being surveyed in hopes of more honest answers, the quantitative method is chosen to complete this study. The PLS-SEM approach will be applied for model measurement and testing.

By using A-priori Sample Size Calculator for Structural Equation Models (https://www.danielsoper.com/statcalc/calculator.aspx?id=89, Faul et al., 2007), with anticipated effect size:0.3, which is medium effect size, Desired statistical power level:0.8, Number of latent variables:5, Number of observed variables:24, as the total items, and Probability level:0.05, the results are shown in Figure below. The minimum Sample Size to detect effect is 150, the minimum Sample Size for model structure is 92 and recommended minimum Sample Size is 150. Thus, the sample used in this study is adequate.

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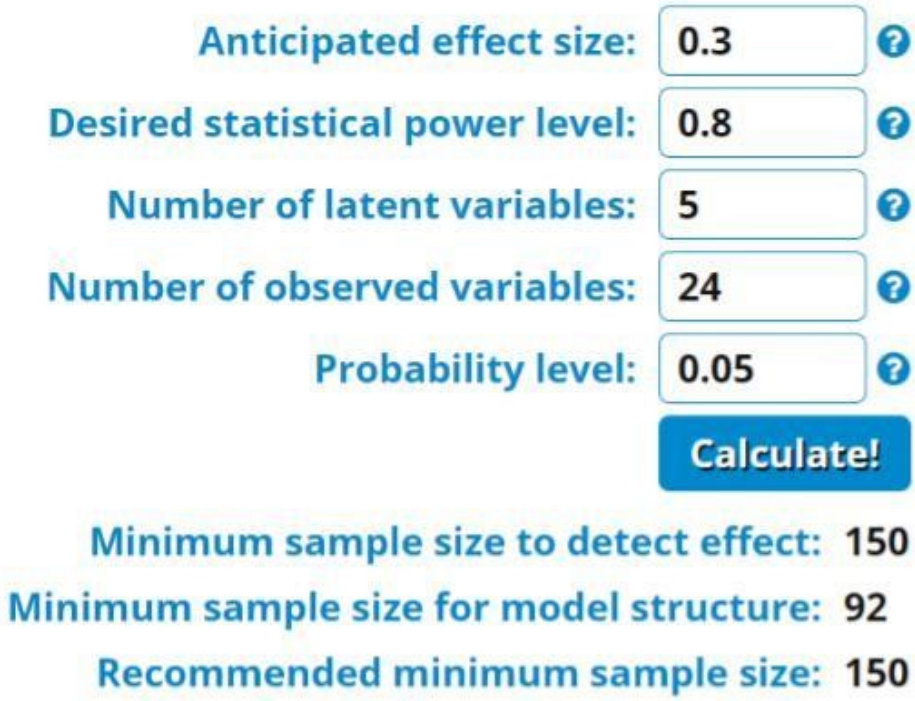

Figure 1. Sampling result

The survey items used to measure the model's constructs in this study are included in Table 1 below. Table 2 shows Cronbach's Alpha value if the item is deleted. All values are above 0.7, indicating higher and stronger reliability indices. The reliability indices for all dimensions were above 0.7 and below 0.95. Thus, no issues of multicollinearity and auto-collinearity occurred. This instrument is suitable for PLS-SEM analysis later in this study.

Table 1. Items in the Instrument of This Study.

Item number	Item	Reference
DV	**Pedagogical Quality (PQ)**	
1	To me, the pedagogical quality of adult education is very important.	Jing (2015)
2	Overall, I think the quality of online teaching for adult higher education in my institution is very good.	
IV1	**Online Platform (OP)**	
1	The online education platform is very responsive, with a good network.	
2	The online education platform can support both computer and mobile (APP) learning.	
3	The platform is well laid out, and I have no trouble finding the needed features.	Guan (2015) Li (2015)
4	The platform provides rich learning resources to meet my learning needs.	

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IV2	**Management Mode (MM)**	
1	The professional courses offered by my institution are managed very well.	Dong (2012) Sun (2017)
2	The quality of videos of this he online education platform is in high quality, which can meet my learning needs.	
3	The teachers of the courses clearly explain the concepts and methods.	
4	Teachers are updating teaching content in a timely manner, introducing new trends and developments in the discipline, and linking theory with practice.	
5	After-school assignments given are very useful.	
6	There is a complete management guideline for my study that helps me to balance my work and life as a student in online adult higher education.	
IV3	**Supervision System (SS)**	
1	Teachers often ask questions by name during live online teaching.	Wang & Zhao (2016)
2	Teachers use various forms such as barrage, voice, chat box, WeChat and etc. to communicate with me in the process of online teaching.	
3	Teachers often organize and guide us to conduct online discussions in the process of online teaching.	
4	Teachers in the online education classroom have helped me to grasp the key points and to solve the difficulties faced.	
5	My teachers have carried out the mixed mode of online and offline teaching successfully	
6	I will actively use the online learning platform without urging or reminders of my teachers.	
IV4	**Evaluation System (ES)**	
1	I am very clear about your course objectives.	Zeng & Deng (2014)
2	Online education can well achieve the teaching objectives of the courses I have taken.	
3	**Online adult higher education has given me the knowledge and skills I need.**	
4	Online adult higher education can inspire me to learn.	
5	Online learning is very helpful for me to gain professional knowledge.	
6	I am willing to continue using the platform to learn.	

Table 2. Reliability Indices of the Dimensions

Dimension	Cronbach's Alpha	N of Items
DV - PQ	.911	2
IV1 - OP	.932	4
IV2 - MM	.946	6
IV3 - SS	.952	6
Iv4 - ES	.951	6

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FINDINGS

Table 3 gives information about the participants' demographics, respectively, calculated in SPSS. No missing data is found.

Table 3. Convergent Validity

Name	Missings	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis
age	0	-	2	1	4	1	4	0.997	-1.044
job	0	-	3	1	7	1	7	1.79	-0.866
reason	0	-	4	1	7	1	7	1.94	-1.143
item1	0	2.211	2	1	5	1	5	1.18	0.113
item2	0	2.169	2	1	5	1	5	1.18	0.111
item3	0	2.188	2	1	5	1	5	1.196	0.312
item4	0	2.172	2	1	5	1	5	1.2	0.16
item5	0	2.188	2	1	5	1	5	1.225	0.09
item6	0	2.195	2	1	5	1	5	1.22	0.228
item7	0	2.195	2	1	5	1	5	1.233	0.094
item8	0	2.237	2	1	5	1	5	1.225	0.12
item9	0	2.16	2	1	5	1	5	1.203	0.012
item10	0	2.183	2	1	5	1	5	1.205	0.202
item11	0	2.179	2	1	5	1	5	1.196	0.165
item12	0	2.129	2	1	5	1	5	1.197	0.18
item13	0	2.157	2	1	5	1	5	1.172	0.184
item14	0	2.176	2	1	5	1	5	1.211	-0.024
item15	0	2.164	2	1	5	1	5	1.199	0.138
item16	0	2.206	2	1	5	1	5	1.182	0.05
item17	0	2.239	2	1	5	1	5	1.201	0.158
item18	0	2.195	2	1	5	1	5	1.207	0.003
item19	0	2.204	2	1	5	1	5	1.236	0.081
item20	0	2.213	2	1	5	1	5	1.211	0.124
item21	0	2.172	2	1	5	1	5	1.2	0.22
item22	0	2.195	2	1	5	1	5	1.189	0.137
item23	0	2.174	2	1	5	1	5	1.203	0.341
item24	0	2.258	2	1	5	1	5	1.244	-0.033

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Table 4 below depicts the measurement model of this study. In this research, the outer factor loadings between items and their underlying constructs calculated by Smart-PLS version 4 (Ringle et al., 2022) showed that each item had an indicator loading greater than 0.707 and a significant value smaller than 0.050. As shown in Table 4 below, all of the factor loadings of the items to corresponding constructs are above 0.7 and significant (p-value < 0.05), which is excellent. Hence, the measurement model has indicator reliability.

Table 4. The Model with Outer Loadings

	ES	MM	OP	PQ	SS
ES1	0.852				
ES2	0.853				
ES3	0.872				
ES4	0.865				
ES5	0.879				
ES6	0.862				
MM1		0.861			
MM2		0.846			
MM3		0.872			
MM4		0.872			
MM5		0.873			
MM6		0.865			
OP1			0.890		
OP2			0.869		
OP3			0.870		
OP4			0.887		
PQ1				0.917	
PQ2				0.915	
SS1					0.850
SS2					0.860
SS3					0.855
SS4					0.841
SS5					0.860
SS6					0.857

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Besides, construct internal consistency reliability indicates how well and to what extent the indicators of one construct measure that construct (Herzog & Tonchia, 2014). In other words, constructing internal consistency shows that the items measure the same thing. Cronbach's alpha assesses scales or test items' internal consistency or reliability (calculated in Smart-PLS version 4 in this study). In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept. Cronbach's alpha is one way of measuring the strength of that consistency (Urbach & Ahlemann, 2010). The higher amount of α indicates the items have more shared covariance and probably measure the same underlying concept. According to Gefen et al. (2011), to check internal consistency, the value of Cronbach's α statistics for exploratory research should be more than 0.6, and for confirmatory research (i.e., CFA) should be more than 0.7. In addition, in CFA and SEM, internal consistency can be checked by composite reliability (CR) and should be more than 0.7 (Urbach & Ahlemann, 2010). The values of Cronbach's α and CRs are shown in Table 5. As shown in Table 5, all values of Cronbach's α and CRs are greater than 0.7, so the measurement model has internal consistency reliability.

Table 5. The Results of Internal Consistency Reliability and Convergent Validity Analysis

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	The average variance extracted (AVE)
ES	0.932	0.932	0.946	0.746
MM	0.933	0.933	0.947	0.748
OP	0.902	0.902	0.931	0.773
PQ	0.808	0.808	0.912	0.839
SS	0.926	0.926	0.942	0.729

The results of both Model with Outer Loadings and Related P- Values and the results of Internal Consistency Reliability and Convergent Validity Analysis have confirmed that the instrument developed in this study is of no question. Therefore, the measurement model is standard, and this instrument can be used to assess the structural model.

Table 6 below shows the Assessment of the Structural Model of this study. Table 6 below shows the path coefficients between all constructs are significant (p-value < 0.01). The results show that all the independent variables significantly and positively affect the dependent variable.

Table 6. Assessment of Structural Model: Path coefficients between all construct

	Path Coefficients		Explained Variance (R2)
ES -> PQ	0.373	0.000	0.788
MM -> PQ	0.202	0.002	
OP -> PQ	0.163	0.003	
SS -> PQ	0.175	0.004	

Besides, as shown in Figure 4 below and Table 6 above, the explained variance of all the constructs (r square is equal to 0.788, which means 78.8% of the variance in the dependent variable construct can be explained by its predictors, which shows all the independent variables are having a substantial effect on the dependent variable in this study, namely SPE.

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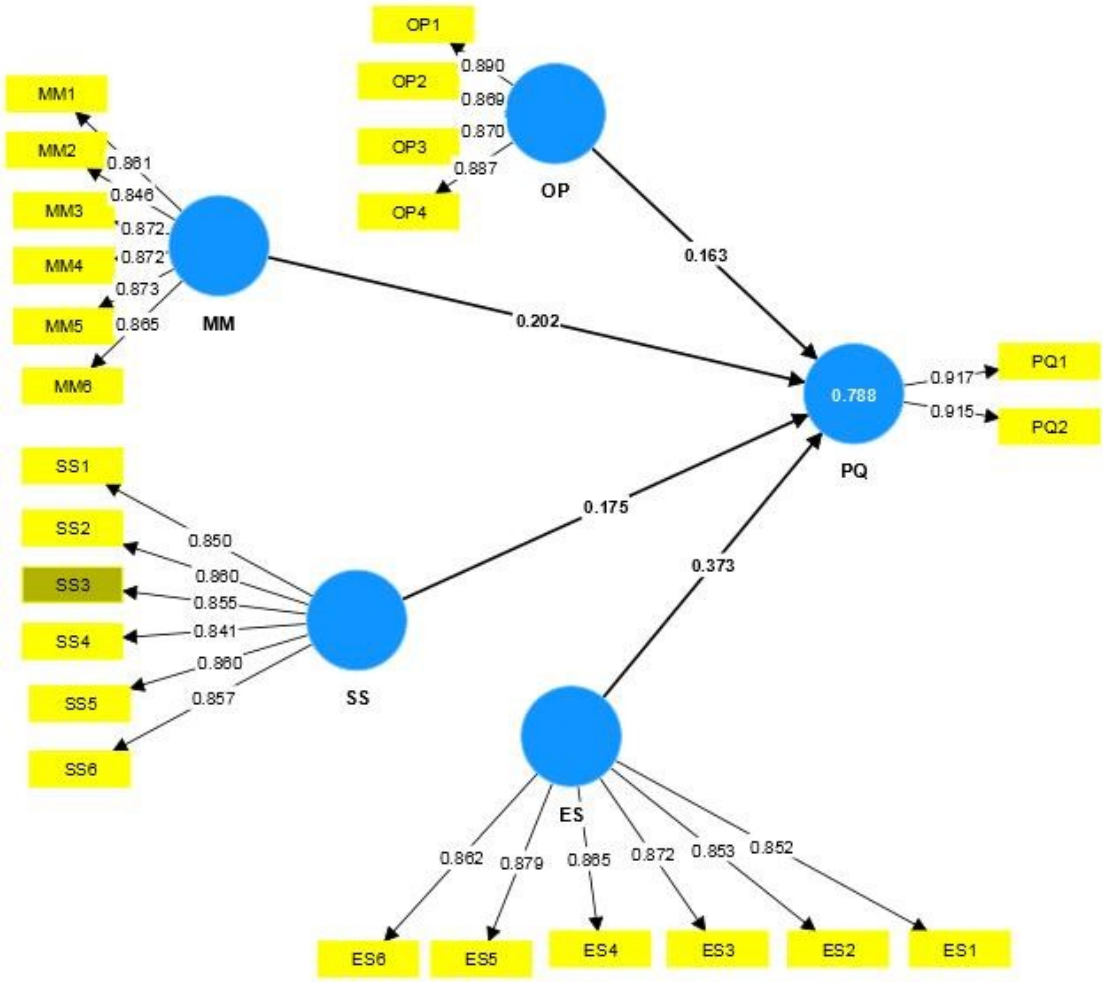

Figure 1. The Graphic Representation of the Model with Path Coefficients and Explained Variance

With the confirmation of Structural Model assessment results and the high value of r square, as shown in Figure 4 and Table 6 above, this study's hypotheses can be tested. Table 7 below shows the major findings on the hypotheses testing of this study.

Table 7. Hypotheses Testing

Hypothesis	Relationships	T value	P values	Decision	95% CILL	95% CIUL
H1	ES -> PQ	6.109	0.000	Accepted	0.253	0.494
H2	MM -> PQ	3.109	0.002	Accepted	0.076	0.332
H3	OP -> PQ	2.953	0.003	Accepted	0.054	0.269
H4	SS -> PQ	2.871	0.004	Accepted	0.058	0.292

For hypothesis 1, the t value is 6.109. No zero value is between 95% CI LL and 95%CI UL. Hence, hypothesis 1 is accepted. For hypothesis 2, the t value is 3.109. No zero value is between 95% CI LL and 95%CI UL. Hence, hypothesis 2 is accepted. For hypothesis 3, the t-value is 2.953. No zero value is between 95% CI LL and 95%CI UL. Hence, hypothesis 3 is accepted. For hypothesis 4, the t-value is 2.871. No zero value is between 95% CI LL and 95%CI UL. Hence, hypothesis 4 is accepted. The study's results highlighted the students' positive relationships towards tasks in blended learning courses. As such, the four hypotheses confirmed in this study were:

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H1: The online platform significantly positively affects pedagogical quality improvement in online adult higher education management reformation.

H2: The management mode significantly positively affects pedagogical quality improvement in online adult higher education management reformation.

H3: The supervision system significantly positively affects pedagogical quality improvement in online adult higher education management reformation.

H4: The evaluation system significantly positively affects pedagogical quality improvement in online adult higher education management reformation.

DISCUSSION

The study has confirmed that Online Platform (OP), Management Mode (MM), Supervision System (SS), and Evaluation System (ES) have significant positive effects on the pedagogical Quality of adult online learners. Therefore, efforts must be made on these four factors to enhance the level of perception of pedagogical quality among the students.

Current study intensifies that an online platform is often related to (a) suppliers, (b) customers, (c) complementary service providers, as well as to (d) product categories and (e) channels (Broekhuizena et al., 2021). It is through the online platform that online learning is offered and carried out. Therefore, the online platform's perceptions highly affect the perception of pedagogical quality improvement. Efforts to ensure the quality of the online learning platform are taken care of and constant communication with the students is essential. Actions to Feedback on continuous improvement have to be taken.

As highlighted by Kara et al. (2019), there are many challenges faced by adult learners in distance education. Among them is management mode. Well-managed administration is found to support enhancing the perception of pedagogical quality. Thus, efforts in ensuring the quality of management mode include having constant communication with the learners, providing managerial supports to the learners, activating the functions of advisory services, taking consideration of feedback from students representatives on managerial supports, and etc.

While the importance of supervision comes to the fore when adults learners are doing online learning. The concept of supervision in the distance education process and the emerging esupervision concept have been discussed by Vaiz et al (2020) in details. Hence, suggestions include enhancing functions of supervisory supports, constant monitoring of the supervisory system, providing channels of reports pertaining to supervisory services, taking actions in solving issues about supervisory problems, providing training for supervisory staff and students on their right to having proper supervisory supports, etc.

Lastly, evaluation is “an activity to collect, analyzes, and present information about a particular object under study, and the results can be used for consideration in making a decision.

The opinion also strengthens the definition states that evaluation is an activity to collect data, data analysis and presentation data to be information about a particular object under study so that the results can be used to make decisions” (Nadeak et al.,2021). The data collected is deemed to be useful for pedagogical quality improvement. Thus, relevant suggestions include monitoring the fairness in the evaluation system, allowing communication and feedback on the evaluation system, constantly improving the evaluation system, exploring the latest methods on the evaluation system, linking research outcomes in improving the evaluation system, etc.

In sum, table 8 below summarizes the efforts and suggestions in upholding the four aspects that will positively affect the perceptions of pedagogical Quality. To improve online learning, it is recommended to prioritize student engagement through interactive activities, discussions, and personalized feedback. Additionally, clear instructions, organization, and resource access can enhance

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the learning experience. These efforts should be implemented to ensure that the level of perceptions on pedagogical Quality is heightened.

Table 8. Efforts and suggestions in upholding the four aspects that will bring positive effects on online learning

Factor		Efforts and suggestions
1	Online Platform (OP)	Constant communication with the students is essential. Actions to feedback on continuous improvement have to be taken.
2	Management Mode (MM)	Having constant communication with the learners, providing managerial supports to the learners activating the functions of advisory services, taking consideration of feedback from students representatives on managerial support.
3	Supervision System (SS)	Enhancing functions of supervisory supports, constant monitoring of supervisory system, providing channels of reports pertaining to. Issues of supervisory services, taking actions in solving issues pertaining to Supervisory problems, providing training for supervisory staff and students on their right of having proper supervisory support.
4	Evaluation System (ES)	Monitoring the fairness in evaluation system, Allowing communication and feedback on evaluation system, Having constant improvement of evaluation system, exploring latest methods on evaluation system, Linking research outcomes in improving evaluation system

DATA AVAILABILITY DECLARATION

The original contributions encompassed within this study are comprehensively documented in the article and accompanying supplementary materials. Should additional inquiries or data-related requests arise, kindly direct them to the attention of the corresponding author.

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CONFLICT OF INTEREST

The authors herein assert that the research undertaken was executed without the influence of any commercial or financial affiliations, which may be perceived as potential conflicts of interest.

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