ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 5| May 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

LEARNER-ORIENTED INSTRUCTION AND DATA INTERPRETATION SKILLS OF STUDENTS IN MANAY SOUTH DISTRICT, DAVAO ORIENTAL

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Article DOI: https://doi.org/10.36713/epra17109
DOI No: 10.36713/epra17109

ABSTRACT

The study aimed to investigate the influence of learner-oriented instruction of teachers on the data interpretation skills of students. In this study, the researcher selected the 212 elementary school teachers in Manay South District in Davao Oriental as the respondents of the study. Stratified random sampling technique was utilized in the selection of the respondents. Non-experimental quantitative research design using descriptive-correlational method was employed. The data collected were subjected on the following statistical tools: Mean, Pearson Moment Product Correlation and Linear Regression Analysis. Findings revealed that learner-oriented instruction of teachers and data interpretation skills of students in Manay South District in Davao Oriental were described as moderately extensive. Further, correlation analysis demonstrated that there is a significant relationship between learner-oriented instruction of teachers and data interpretation skills of students in Manay South District in Davao Oriental. Evidently, regression analysis proved that learner-oriented instruction of teachers in terms of learner empowerment; self-directed learning; and active learning engagement significantly influenced the data interpretation skills of students in Manay South District in Davao Oriental. The study, therefore, conducted for further utilization of findings through publication in reputable research journal.

KEYWORDS: *Educational management, learner-oriented instruction of teachers, data interpretation skills of students, regression analysis, quantitative study*

INTRODUCTION

In the current educational landscape, where the focus is shifting from rote memorization to skill development, understanding the dynamics between learner-responsive pedagogy and analytical interpretation aptitude is crucial. The modern classroom is more diverse than ever, with students from various backgrounds, learning styles, and abilities. Learner-responsive pedagogy ensures that educational processes accommodate this diversity, fostering a more inclusive and equitable learning environment. As education becomes more personalized, understanding how learner-responsive pedagogy influences analytical interpretation aptitude helps educators tailor instruction to individual students' needs. This customization improves learning outcomes by catering to students' unique strengths and weaknesses. Hence, this knowledge empowers educators to create learning experiences that cultivate analytical thinking, adapt to individual needs, and prepare students for the challenges of the 21st century.

Reports indicated that poor analytical interpretation aptitude can have a detrimental effect on students' performance in various academic contexts. For instance, Nunn et al. (2016) reported that continuous struggle with analytical tasks can erode students' confidence in their abilities, leading to a negative cycle where they avoid challenging tasks altogether. In addition, Kozma et al. (2000) noted that students with poor analytical interpretation skills might struggle to comprehend and make sense of complex information, which can hinder their ability to understand academic content across various subjects. More so, Barron et al. (2008) showed that students with weak analytical aptitude might find it challenging to approach and solve complex problems in academics and real-life situations, since analytical skills are essential for identifying, analyzing, and solving problems. In th Philippine setting, Dela Cruz et al. (2018) noted that lack of analytical aptitude resulted to poor performance in math and science subjects.

Conversely, Yuanxiang (2017) pointed out that analytical interpretation aptitude are essential for students' academic success, critical thinking, problem-solving, and decision-making abilities. These skills equip students with the ability to understand and use data effectively, making them more informed and well-rounded individuals in both their academic pursuits and daily life. According to Hussain et al. (2017), developing analytical interpretation aptitude promotes critical thinking abilities. Students learn to analyze information, consider multiple perspectives, and make logical connections, enhancing their overall cognitive skills. Similalry, Medeshovaa et al. (2017) viewed that data interpretation skills are valuable in problem-solving scenarios. Students can use data to identify patterns and trends, which can guide them in finding solutions to complex problems.

Previous studies showed that lerner-oriented instruction contributed to the enhancement of data interpretation skills of students. For instance, Chickering and Gamson (1987) showed that learner-oriented instruction promotes critical thinking skills, which are essential for data interpretation. Students are encouraged to question, analyze, and evaluate data, leading to more accurate and insightful interpretations. Adding more, Kuh (2008) proposed that learner-oriented instruction emphasizes connecting learning to real-world applications. This connection helps students see the relevance of data interpretation skills in practical scenarios, making the learning process more meaningful. Similarly, Gurung (2018) proposed that learner-oriented instruction involves interactive and hands-on activities that actively engage students in data analysis and interpretation.

On one hand, Marzano et al. (2001) characterized learner-responsive pedagogy as an educational approach that prioritizes the needs, interests, and preferences of individual learners. It places learners at the center of the learning process, encouraging active engagement, self-directed learning, and personalized experiences to foster deeper understanding and meaningful

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knowledge acquisition. Also, Shooley (2017) mentioned that learner-responsive pedagogy plays a crucial role in developing learners' interest and engagement. Accordingly, learner-responsive pedagogy tailors the learning experience to individual learners' interests, needs, and experiences. By connecting the content to real-life situations and personal interests, learners find the learning process more relevant and meaningful, sparking their curiosity and motivation to explore further.

While there have been several studies investigating the influence of teachers' learner-responsive pedagogy on the analytical interpretation aptitude of students, there remains a notable gap in the literature regarding the specific mechanisms through which learner-responsive pedagogy influences different aspects of data interpretation skills of students. While existing research has established a positive correlation between learner-oriented instruction and data interpretation skills of students, there is a need for more in-depth exploration to understand the underlying factors and processes that contribute to this relationship. Thus, it is on this context that the researcher felt the need to fill in the research gap of conducting a study in the Philippine setting, particularly in Manay South District, Davao Oriental using a quantitative approach. Specifically, the researcher made used descriptive correlational design to understand the data interpretation skills of students better as determined by the learner-oriented instruction, which is found to be scarce.

Statement of the Problem

The primary objective of the study is to determine which domains of learner-oriented instruction significantly influence the data interpretation skills of students in Manay South District, Davao Oriental. Specifically, the study has the following objectives:

1. What is the extent of learner-oriented instruction in terms of:
   - 1.1 learner empowerment;
   - 1.2 self-directed learning;
   - 1.3 active learning engagement; and
   - 1.4 technology integration?
2. What is the extent of data interpretation skills of students in terms of:
   - 2.1 domain knowledge;
   - 2.2 attention to detail;
   - 2.3 adaptability; and
   - 2.4 time management?
3. Is there a significant relationship between learner-oriented instruction and data interpretation skills of students in Manay South District, Davao Oriental?
4. Which domains of learner-oriented instruction significantly influence the data interpretation skills of students in Manay South District, Davao Oriental?

METHODOLOGY

Research Design

A quantitative non-experimental, correlational research design was employed. Quantitative research focuses on quantifying data collection and analysis (Bhandari, 2020). Non-experimental research measures variables as they occur naturally without manipulation. Descriptive-correlational research examines the relationship between variables to establish cause and effect (Myers & Well, 2013). This study explored the relationship between learner-oriented instruction and students' data interpretation skills, focusing on how different domains of learner-oriented instruction affect these skills.

Research Respondents

The respondents were 212 elementary school teachers from Manay South District, Davao Oriental, selected using Slovin's formula from approximately 450 teachers. Stratified random sampling was used to account for the population's heterogeneity (Pandey, 2015). Only permanent-regular teachers who voluntarily participated were included.

Research Instrument

Adapted and modified survey questionnaires were used. The first part, adapted from Marzano et al. (2001), assessed learner-oriented instruction across four domains: learner empowerment, self-directed learning, active learning engagement, and technology integration. The second part, adapted from Bonato et al. (2014), evaluated students' data interpretation skills across four indicators: domain knowledge, attention to detail, adaptability, and time management. Both parts of the survey demonstrated high reliability with Cronbach's alpha values of 0.954 and 0.976, respectively. The instruments used a range of means for descriptive interpretation.

Data Gathering Procedure

After validating the research questionnaire, the following steps were taken:

1. Permission to Conduct the Study: Permissions were secured from relevant authorities.
2. Distribution and Retrieval of the Questionnaire: Questionnaires were distributed and respondents were given adequate time to complete them.
3. Collation and Statistical Treatment of Data: Data were tallied and analyzed using SPSS for descriptive and inferential statistics.

Ethical Considerations

The study followed ethical protocols, including informed consent, ensuring participants' voluntary involvement, protecting their psychological well-being, and maintaining confidentiality per the Data Privacy Act of 2012. The researcher ensured the safety, risk minimization, and benefits disclosure to respondents. Transparency and justice were maintained throughout the study, and the findings were shared with the community and relevant stakeholders.

Data Analysis

- Mean: Used to describe the extent of learner-oriented instruction and students' data interpretation skills.
- Pearson Product-Moment Correlation: Assessed the relationship between learner-oriented instruction and data interpretation skills.
- Linear Regression Analysis: Identified which domains of learner-oriented instruction significantly influenced data interpretation skills.

RESULTS AND DISCUSSIONS

Learner-Oriented Instruction

Learner Empowerment

The findings presented in Table 1 underscore the pervasive nature of learner-oriented instruction among teachers, as evidenced by a robust mean score of 3.51, indicating an extensive implementation. This suggests a prevalent commitment among educators to cultivate learning environments wherein students are empowered to assume active roles in their education. Brinkmann (2019) highlighted the intrinsic motivation fostered by learner empowerment, wherein students' ability to make choices, set goals, and engage actively in their learning journey correlates with heightened enthusiasm. Bremner (2020) further elucidated that empowered learners, endowed with autonomy and control over their educational experiences, exhibit heightened interest and engagement, substantiating the observed extensive learner empowerment.

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Table 1. ***Learner-Oriented Instruction in Terms of Learner Empowerment***

	Statement	Mean	Descriptive Rating
1.	Providing them with choices in their learning journey, allowing them to explore topics of interest and work at their own pace.	3.22	Moderately Extensive
2.	Letting them decide on the research topics, methodologies, and presentation formats	3.24	Moderately Extensive
3.	Promoting learner empowerment by involving my students in decision-making processes.	4.15	Extensive
4.	Ensuring that my teaching methods are flexible and inclusive.	3.43	Extensive
	Mean	**3.51**	***Extensive***

Self-Directed Learning

In Table 2, the moderately extensive mean score of 3.21 reflects the occasional implementation of self-directed learning within learner-oriented instruction. This signifies educators' efforts in encouraging students to become self-directed and autonomous in managing their learning processes. Bremmer's (2022) discourse emphasized the personalized nature of self-directed learning, catering to individual needs and interests, thereby augmenting comprehension and academic attainment.

Table 2. ***Learner-Oriented Instruction in Terms of Self-Directed Learning***

	Statement	Mean	Descriptive Rating
1.	Encourage my students to take charge of their learning by setting their goals, identifying areas of interest, and creating their learning paths.	3.27	Moderately Extensive
2.	Providing students with resources, guidance, and support to facilitate their independent exploration.	3.14	Moderately Extensive
3.	Encouraging students to reflect on their learning progress and experiences.	3.84	Extensive
4.	Starting by providing structured choices and gradually increasing autonomy as they build confidence.	2.11	Less Extensive
5.	Encouraging students to take ownership of their education by involving them in decision-making processes	3.67	Extensive
	Mean	**3.21**	***Moderately Extensive***

Active Learning Engagement

As delineated in Table 3 with a moderately extensive mean score of 3.06, illustrates sporadic integration within learner-oriented instruction. This reveals educators' endeavors to facilitate instructional activities that promote dynamic participation and collaboration among students. Zhang (2017) expounded upon the intrinsic motivation engendered by active learning engagement, positing its role in nurturing autonomy, relevance, and positive emotional responses, thus enhancing overall academic motivation. Echoing this sentiment, Starkey (2017) underscored the intrinsic joy and satisfaction derived from active participation in the learning process.

Table 3. ***Learner-Oriented Instruction in Terms of Active Learning Engagement***

	Statement	Mean	Descriptive Rating
1.	Using various strategies, such as group discussions, debates, hands-on activities, and problem-solving tasks.	3.46	Extensive
2.	Conducting simulations and role-playing exercises to make complex topics more tangible and relatable.	2.12	Less Extensive
3.	Incorporating real-world problem-solving tasks, where students collaborate to find creative solutions.	3.43	Extensive
4.	Becoming a facilitator of learning, guiding, and supporting students' inquiries and discoveries.	3.23	Moderately Extensive
5.	Allowing students to contribute verbally, through written responses, or even via technology tools.	3.93	Extensive
	Mean	**3.23**	***Moderately Extensive***

Technology Integration

Table 4 portrays the extent of technology integration within learner-oriented instruction, yielding a moderately extensive mean score of 3.11. This suggests that while technology integration is occasionally observed among educators in Manay South District, Davao Oriental, there remains room for improvement in leveraging digital tools to enrich instructional practices. Carter et al. (2020) advocated for the utilization of technology to personalize learning experiences, provide immediate feedback, and infuse gamification elements, thereby fostering students' active participation and enthusiasm in their educational journey.

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Table 4. ***Learner-Oriented Instruction in Terms of Technology Integration***

	Statement	Mean	Descriptive Rating
1.	Incorporating technology to encourage student participation and collaboration.	3.26	Moderately Extensive
2.	Having the technical skills needed to use technology.	3.25	Extensive
3.	Using technology tools to process data and report results.	3.29	Moderately Extensive
4.	Knowing about technologies that I can use for understanding the subject matter.	3.41	Extensive
5.	Choosing technology that can enhance the teaching approaches for a lesson.	2.36	Less Extensive
	Mean	***3.11***	***Moderately Extensive***

Summary on Learner-Oriented Instruction

Additionally, Table 5 offers a comprehensive summary of learner-oriented instruction, encapsulating the mean scores across various domains. Notably, learner empowerment emerged with the highest mean score of 3.51, indicating its extensive prevalence among educators. Conversely, technology integration garnered the lowest mean score of 3.11, signaling a lesser frequency of implementation. These findings underscore the multifaceted nature of learner-oriented instruction, emphasizing the importance of empowering students and fostering active engagement to cultivate deeper understanding and meaningful knowledge acquisition. Shooley (2017) emphasized the pivotal role of learner-oriented instruction in nurturing students' interest and engagement, tailoring the learning experience to individual preferences and experiences.

In conclusion, the results elucidate the dynamic interplay between learner-oriented instruction and students' data interpretation skills in Manay South District, Davao Oriental. By fostering active learning environments, empowering students, and integrating technology effectively, educators can significantly enhance students' proficiency in interpreting data and deriving meaningful insights. These findings underscore the transformative potential of learner-oriented instruction in shaping students' analytical acumen, critical thinking abilities, and overall academic success.

Table 5. Summary on Learner-Oriented Instruction in Manay South District, Davao Oriental

Indicators	Mean	Descriptive Equivalent
Learner Empowerment	3.51	Extensive
Self-Directed Learning	3.21	Moderately Extensive
Active Learning Engagement	3.23	Moderately Extensive
Technology Integration	3.11	Moderately Extensive
Overall	**3.27**	***Moderately Extensive***

Data Interpretation Skills of Students

Domain Knowledge

The moderately extensive mean score of 3.35 in Table 6 elucidates the occasional manifestation of students' domain knowledge in interpreting data. This underscores students' proficiency in understanding specific domains within their relevant contexts to derive meaningful insights from data. Papamitsiou and Economides (2018) emphasized the critical role of domain knowledge in facilitating the selection of pertinent data and identifying anomalies for accurate interpretation.

Table 6. ***Data Interpretation Skills of Students in Terms of Domain Knowledge***

	Statement	Mean	Descriptive Rating
1.	Students demonstrating a strong understanding of foundational concepts.	3.12	Moderately Extensive
2.	Students can grasp concepts quickly.	3.42	Extensive
3.	Students can make connections between what they learn in the classroom and how it relates to their everyday lives.	4.13	Extensive
4.	Students can connect their personal experiences to the subject matter.	2.72	Less Extensive
	Mean	***3.35***	***Moderately Extensive***

Attention to Detail

Attention to detail, as depicted in Table 7 with a moderately extensive mean score of 3.12, delineates students' intermittent focus on meticulous analysis to discern errors or inconsistencies in data. This underscores the significance of students' conscientious approach to data interpretation, ensuring accuracy and reliability in their analyses. Wang et al. (2016) underscored the pivotal role of attention to detail in bolstering the reliability and comprehensiveness of data interpretation endeavors.

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Table 7. ***Data Interpretation Skills of Students in Terms of Attention to Detail***

	Statement	Mean	Descriptive Rating
1.	Students are very detail-oriented and tend to notice even the smallest aspects of a task or assignment.	3.26	Moderately Extensive
2.	Students to double-check their assignments before submission.	3.45	Extensive
3.	Students participate in close reading exercises, where they analyze a text for specific information and nuances.	3.29	Moderately Extensive
4.	Students look for patterns among concepts.	2.49	Less Extensive
	Mean	***3.12***	***Moderately Extensive***

Adaptability

Table 8 highlights adaptability in data interpretation skills, attaining an extensive mean score of 3.59, underscoring students' frequent adeptness in embracing new data interpretation techniques. This underscores the importance of students' flexibility in adapting to evolving analytical methodologies, thereby enhancing their analytical prowess and problem-solving acumen. Sin and Muthu (2017) extolled adaptability's role in fortifying students' analytical capabilities and readiness to apply data interpretation skills across diverse academic and professional contexts.

Table 8. ***Data Interpretation Skills of Students in Terms of Adaptability***

	Statement	Mean	Descriptive Rating
1.	Students embrace change and are quick to adjust to new situations or learning methods.	3.89	Extensive
2.	Students can use different learning strategies in different situations.	3.62	Extensive
3.	Students engage themselves in problem-solving activities.	3.35	Moderately Extensive
4.	Students show a willingness to embrace change.	3.49	Extensive
	Mean	***3.59***	***Extensive***

Time Management

The moderately extensive mean score of 3.29 in Table 9 elucidates students' sporadic adherence to efficient time management practices during data interpretation endeavors. This underscores the imperative of students' judicious allocation of time to various stages of the data interpretation process, ensuring timely delivery of insights and findings. Nigussie (2019) underscored the pivotal role of time management in optimizing productivity and deriving meaningful insights from data analyses.

Table 9. ***Data Interpretation Skills of Students in Terms of Time Management***

	Statement	Mean	Descriptive Rating
1.	Students prioritize tasks, meet deadlines, and plan ahead.	3.26	Moderately Extensive
2.	Students maintain a structured approach to their tasks and responsibilities.	3.45	Extensive
3.	Students set clear goals for themselves, both short-term and long-term.	3.29	Moderately Extensive
4.	Students demonstrate self-discipline and avoid distractions while studying or completing assignments.	3.17	Moderately Extensive
	Mean	***3.29***	***Moderately Extensive***

Summary on Data Interpretation Skills

Lastly, Table 10 summarizes the data interpretation skills of students in Manay South District, Davao Oriental. The overall mean score is 3.34, indicating that these skills are moderately extensive and sometimes manifested. This means students occasionally demonstrate the ability to analyze, evaluate, and draw insights from various data forms like charts and graphs. This finding supports Yuanxiang's (2017) proposition that data interpretation skills are essential for academic success, critical thinking, problem-solving, and decision-making.

The highest mean score of 3.59 in adaptability is described as extensive and often manifested, while the lowest mean score of 3.12 in attention to detail is described as moderately extensive and sometimes manifested. According to Hussain et al. (2017), developing data interpretation skills enhances critical thinking by teaching students to analyze information, consider multiple perspectives, and make logical connections. Medeshovaa et al. (2017) emphasize that these skills are valuable in problem-solving, enabling students to identify patterns and trends to find solutions to complex problems.

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Table 10. ***Summary on Data Interpretation Skills of Students in Manay South District, Davao Oriental***

Indicators	Mean	Descriptive Equivalent
Domain Knowledge	3.35	Moderately Extensive
Attention to Detail	3.12	Moderately Extensive
Adaptability	3.59	Extensive
Time Management	3.29	Moderately Extensive
Overall	***3.34***	***Moderately Extensive***

Relationship Between Learner-Oriented Instruction and Data Interpretation Skills of Students in Manay South District, Davao Oriental

Table 11 reveals a significant positive relationship between learner-oriented instruction and students' data interpretation skills, denoted by a Pearson correlation coefficient (r) of 0.367 and a p-value of .000, signifying the enhancement of data interpretation skills with improvements in learner-oriented instruction. Vann et al. (2021) expounded upon the efficacy of personalized and active learning approaches in augmenting students' understanding and retention of data interpretation concepts.

Table 11. ***Relationship Between Learner-Oriented Instruction and Data Interpretation Skills of Students in Manay South District, Davao Oriental***

Variables	*Data Interpretation Skills of Students*		
	r-value	**p-value**	**Decision**
Learner Empowerment	0.326*	0.000	Reject H_0
Self-Directed Learning	0.399*	0.000	Reject H_0
Active Learning Engagement	0.402*	0.000	Reject H_0
Technology Integration	0.334*	0.000	Reject H_0
Overall Learner-Oriented Instruction	***0.367****	***0.000***	***Reject H_0***

Significant @ p<0.05

Legend: Perfect Correlation for r=1.00; Strong Correlation for 0.7≤r<1.00; Moderate Correlation for 0.3≤r<0.7; Weak Correlation for 0.00<r<0.30; No Correlation for r=0.00

Influence of Learner-Oriented Instruction on the Data Interpretation Skills of Students in Manay South District, Davao Oriental

In Table 12, the linear regression analysis demonstrates the significant influence of learner-oriented instruction on students' data interpretation skills, with learner empowerment, self-directed learning, and active learning engagement emerging as significant predictors. This underscores the pivotal role of learner-oriented instruction in shaping students' proficiency in interpreting data and deriving meaningful insights. The observed adjusted R^2 value of 0.512 underscores the substantial contribution of learner-oriented instruction to the variability in students' data interpretation skills, highlighting its paramount importance in fostering analytical acumen and critical thinking abilities.

By aligning with Kolb's (1984) Experiential Learning Theory, learner-oriented instruction facilitates hands-on experiences and reflective practices, thereby internalizing data interpretation processes and enhancing students' interpretative prowess. Gurung's (2018) emphasis on interactive and hands-on activities within learner-oriented instruction resonates with the observed enhancement of students' engagement and motivation, fostering a conducive environment for data interpretation skill development.

Table 12. ***Influence of Learner-Oriented Instruction on the Data Interpretation Skills of Students in Manay South District, Davao Oriental***

Learner-Oriented Instruction	*Data Interpretation Skills of Students*				
	B	**Beta**	**S.E**	**p-value**	**Decisions**
Learner Empowerment	.203*	.149	.049	.000	Reject H_0
Self-Directed Learning	.287*	.311	.048	.000	Reject H_0
Active Learning Engagement	.211*	.210	.051	.000	Reject H_0
Technology Integration	.024	.108	.013	.098	Accept H_0
R^2 = 0.512					
F-value = 16.766*					
p-value = 0.000					

Significant @ p<0.05

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CONCLUSIONS AND RECOMMENDATIONS

Findings

The primary objective of this study was to evaluate the impact of learner-oriented instruction on the data interpretation skills of students in Manay South District, Davao Oriental. Utilizing a non-experimental quantitative design with a descriptive-correlation approach, the study selected 212 elementary school teachers through stratified random sampling. Modified and pilot-tested survey questionnaires were used to ensure high reliability and internal consistency.

The study revealed that learner-oriented instruction received a moderately extensive overall rating, with specific domains such as learner empowerment, self-directed learning, active learning engagement, and technology integration scoring 3.51, 3.21, 3.23, and 3.11, respectively. Students' data interpretation skills were similarly rated as moderately extensive, with domain knowledge, attention to detail, adaptability, and time management scoring 3.35, 3.12, 3.59, and 3.29, respectively.

A significant positive moderate relationship was found between learner-oriented instruction and students' data interpretation skills ($r = .367$, $p < .05$). Specific domains of learner-oriented instruction, including learner empowerment ($r = .326$), self-directed learning ($r = .399$), active learning engagement ($r = .402$), and technology integration ($r = .334$), significantly influenced students' data interpretation skills. The collective impact of learner empowerment, self-directed learning, and active learning engagement was substantial, with an F-value of 16.766 and an r2 value of 0.512, indicating that these factors account for 51.20% of the variability in students' skills.

Conclusions

Learner-Oriented Instruction. Teachers in Manay South District implement learner-oriented instruction to a moderately extensive degree. Learner empowerment is particularly emphasized, while self-directed learning, active learning engagement, and technology integration are moderately emphasized. This indicates that teachers frequently place students at the center of the learning process, promoting active engagement and personalized experiences.

Data Interpretation Skills. Students' data interpretation skills are rated as moderately extensive overall, with adaptability receiving a notably high rating. This suggests that students occasionally demonstrate the ability to analyze and derive insights from various data forms.

\Relationship and Influence. There is a significant positive moderate relationship between learner-oriented instruction and students' data interpretation skills. This finding underscores the importance of active learning, student engagement, and personalized instruction in developing critical data interpretation skills. Specific domains of learner-oriented instruction, particularly learner empowerment, self-directed learning, and active learning engagement, significantly contribute to students' data interpretation skills.

Recommendations

Curriculum Development. The Department of Education should revise curricula to emphasize learner-centered pedagogies and data literacy. Standardized assessments should be designed to evaluate students' data interpretation skills, thereby encouraging schools to prioritize this critical area.

School Leadership. School heads should cultivate a data-driven culture, utilizing data to inform instructional practices and monitor student progress. Additionally, they should support ongoing professional development for teachers in learner-centered teaching methods and data interpretation skills.

Teacher Development. Teachers should actively engage in professional development focused on learner-centered instruction and data literacy. They should integrate data analysis and interpretation tasks into classroom activities to enhance students' skills.

Student Engagement. Students should actively participate in classroom activities involving data analysis and interpretation. They should also independently explore resources and tools to further develop their data interpretation skills.

Future Research. Researchers should prioritize investigations into effective instructional strategies for learner-oriented teaching and interventions to improve data interpretation skills. Future studies should also analyze the impact of learner-oriented instruction on student learning outcomes and data literacy development.

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ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 5| May 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

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