



**RESEARCH PAPER**

**Effect of Instructional Leadership on Student Academic Achievement  
in Science Subjects at Secondary School Level**

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**ABSTRACT**

The purpose of this study was to measure the effect of instructional leadership on students' academic achievement in science subjects (Physics, Chemistry, and Biology) at secondary level. Instructional leadership includes the leadership capacity of an individual such as head teacher to provide instructional resources, maximize instructional time for teachers, and maximize instruction related activities to improve student achievement. The population of the study included all science teachers and their students of grade 10 in public high schools in Baluchistan. Instructional Leadership Questionnaire (ILQ) was adopted after getting consent from the authors. Pilot-testing was conducted to ensure the reliability of the questionnaire. Later on, using the multistage sampling technique, 2797 students and 388 teachers were selected from 6 districts (Quetta, Pishin, Sibi, Lasbela, Killa Abdullah, and Chaman) of Balochistan. Instructional Leadership Questionnaire was found to be highly reliable. ( $\alpha=.84$ ). The achievement scores of the 2797 students in Physics, Chemistry, and Biology were collected from their respective schools. Moderate positive relationship of instructional leadership and students' achievement in Physics, Chemistry, and biology were found. Multiple regression analysis showed that Instructional leadership predicted 46% of variance in Physics achievement, 38% in Chemistry, and 49 % in Biology achievement. The study recommended implementing instructional leadership practices in schools to increase students' achievement in science subjects.

**Keywords:** Curriculum Implementation, Instructional Leadership, Maximizing Instructional Time, Professional Development, Resource Provider

**Introduction**

The purpose of the present study was to measure the effect of instructional leadership on students' academic achievement in subjects of science at secondary school level in Baluchistan. Instructional leadership is about to the management of instruction and curriculum by the head teacher or principal in the school. Instructional leadership emerged as a leadership idea in America in 1980s when studies found that head teacher's role is essential to ensure success in students' learning (Hallinger, 2009). Effective instructional leaders focus on providing sufficient resources to the teachers which help them to teach better and contribute to student achievement (Akram, Kiran, & Ilgan, 2017). Instructional leaders are involved in activities that maximize teachers' commitment, innovativeness in the school, and professional involvement which lead to increase student motivation and maximize their achievement (Walker, 2016).

There is a plethora of research that has evidenced that effective instructional leaders support brilliance and excellence in education that maximize teachers' commitment and increase student achievement (Blase & Phillips, 2010; Fullan, 2014; Kemethofer et al., 2022; Stronge, 2022). Sergiovanni (2007) found that effective instructional leaders share their vision with teachers, help them to use innovating teaching methods, share a cooperative

school culture, and maintain resources to help teachers perform effectively. The overall focus of instructional leader, therefore, remains toward improving students' performance.

Combining to it, this study focused on measuring the effect of Instructional leadership focused on student outcomes in science subject (Physics, Chemistry, and Biology) at secondary level in Baluchistan. Bryan et al. (2011) stated of the view that secondary classes are very crucial in students' lives as they select science subjects for their future. The researchers selected student achievement in science subjects as a dependent variable as there are evidences that student have been underperforming in science subjects in the Board examination in secondary classes in Balochistan. Majority of the secondary school students select science subject in class 10 but a large number of them cannot achieve good marks or fail.

According to Quetta Board of Intermediate and Secondary Education, thousands of students fail in Physics, Chemistry and Biology every year (BISE, 2018, 2019, 2020, 2021, 2022). Despite of various reasons of lesser number of student success in science subjects on board examination such as teacher qualification, school facilities, and low quality of teaching, it is important to understand that head teachers' instructional leadership plays a vital role to help students succeed in science subjects.

The literature provides evidence that when head teachers act as instructional leaders, they do not directly affect student learning (Sergiovanni, 2005), but they provide every possible facility to the teachers to teach well in the classroom. They are resource providers to the teachers, do not invite them for meeting during class time; rather they maximize instructional time of teachers and do not allow outsiders such as parents and other persons to meet teachers during class timings. An effective instructional leader maintains visible presence in the school, focus on teachers' professional development, and monitor students' progress continuously (Akram et al., 2017; Whitaker, 1997). It means if we place effective instructional leaders in our schools, we will, most probably, be able to see improved student learning and achievement in board examinations.

The researchers thoroughly searched literature on measuring the effect of instructional leadership on students' achievement in science subjects but could not find any study of this nature in national or international contexts. This study may help teachers and head teachers to get better understanding of their role as instructional leaders. The researchers used Instructional Leadership Questionnaire developed by Akram, Kiran, and Ilgan (2017) while student achievement marks of 10<sup>th</sup> grades on BISE examinations were collected from the relevant schools. Proper permissions were taken from the authors of the questionnaires.

## **Literature Review**

### **Instructional leadership**

Instructional leadership is a style of leadership that is focused on the instruction and learning of students. Instructional leaders are responsible for creating a learning environment that is conducive to student learning, and they work to ensure that all students have the opportunity to learn. Instructional leaders also work to ensure that teachers are effective in their instruction, and they provide support and professional development to help teachers improve their teaching skills. One of the key characteristics of instructional leadership is the focus on student learning. Instructional leaders are always looking for ways to improve student learning, and they are constantly seeking new and innovative ways to help students learn. They also work to create a positive learning environment in which students feel safe and supported. Instructional leaders know that a positive learning environment is essential for student success, and they work hard to create positive environment in their schools.

Another key characteristic of instructional leadership is the focus on teacher effectiveness. Instructional leaders know that the success of their students depends on the effectiveness of their teachers, and they work to ensure that all teachers are effective in their instruction. Instructional leaders are accountable to ascertain supportive and collaborative school cultures through exhibiting behavior as facilitator that improves the capabilities of teachers. Instructional leader empowered to attain the goals of student learning and school effectiveness focusing on the taking of initiatives by workforce (Green, 2010). Instructional leaders are focused on the future, create changes, develop shared culture and employ the personal authority. These leaders try to maintain the prevailing structures, focus on the emerging trends, and use their authority for school improvement (Nahavandi, 2012).

### **Models of Instructional Leadership**

Duke (1982) recommended six dimensions of instructional leadership to enhance teacher effectiveness and school improvement. They include *staff development, instructional support, Resource acquisition and allocation, quality control, Coordination, and troubleshooting*. Hallinger and Murphy (1985) stated that *developing the school mission, implementing the instructional program, and supporting a positive school climate* as three major factors of instructional leadership. Andrew, Bascom, and Bascom (1991) stated instructional leadership includes four strategies: *resource provider, instructional resource, communicator, and visibility* Max Weber's Model (1996) gave four crucial components of the leadership about instruction: mission statement, managing the instructional process and organization of curriculum, developing positive and effective learning environment, and instructional improvement. *Spillane, Halverson, and Diamond Model (2004)* stated that the instructional leaders construct and share instructional vision, build and maintain school culture, obtain and distribute the resources including time, materials, compensation and support, enhance growth and development of teachers, provide formative and summative monitoring about instruction, and build a such school climate that do not disturb the instructional activities (Spillane et al., 2004). *Akram, Kiran, and Ilgan (2017)* gave a tool to measure the instructional leadership which is validated through different expert having some important factors such as ensuring visible presence, instructional resource provider, making professional development of their teachers, supervising of student learning, giving feedback on teaching and learning progress, and improving the instructional plan.

### **Factors of Instructional Leadership**

School principal functions, first, as *instructional resource provider* in the school. Teaching staff can work more effectively when they have sufficient resources for teaching (Leithwood, & Louis, 2021). Principal as resource provider coordinates with other stakeholders regarding the provision of these instructional resources to the teaching staff and students in the school (Liu, 2004). Louis, and Leithwood, (2021) have recommended the responsibilities of school head teachers as instructional resource provider and facilitator in the school. Second, school principal ensures *his presence* in the school for staff and students when he/she is functioning as instructional leader in the school. His presence is necessary for the enhancement of instructional practices in the school (Ng, et al., 2012). Successful instructional leader ensures his visible presence in the institution. Teachers teaching targets are supported and students learning targets are made easy for them by providing them support. This can be possible when school principal ensures his visible presence (Northouse, 2007).

Third, *teachers' professional development* is very essential. Focusing the significance of teachers' professional development, school principal ensures his visible presence in school and provides opportunities for their professional development.. This principal's effort for teachers' professional development not only would be beneficial for teachers but also for students' academic achievement. It may improve school learning environment and

motivate students to work more actively for the achievement of their instructional learning outcomes (Postholm, 2011).

Fourth, *Instructional time* increases time span for the aims of instructional activities and testing (Rashid, & Mansor, 2018). Time allocation for activities enables teachers and students to communicate well for the understanding instructional plan and procedures. Principal's priority to provide time for instructional activities enhances teachers' ability to meet their obligation of teaching appropriately. School principal as instructional leader organizes and arranges activities with anticipation for the improvement of students in schools. Principal visits classes frequently to ensure the well utilization of time. Purposeful activities are arranged on targeting the instructional objectives and learning outcomes of the students. It also enables teachers to control class attendance that is irregular. Five, School principal *monitors students' progress* to evaluate and assess the success and failure of instructional resources, visible presence in institutions, and development of teaching staff (Sergiovanni, 2005). Parents are also made aware about the progress of their children. They feel satisfaction by evaluating the educational progress of their children.

Six, School principal as instructional leader arranges *feedback system on teaching and learning* process on regular basis (Shatzer, 2010). An effective principal locates shortcomings and improved strategies and gives feedback constructively easily. Lastly, *Curriculum implementation* requires suitable teaching environment, learning content, effective management, availability of resources in the lab and laboratories, classroom management in the school (Troutman, 2012). They arrange activities and content as per instructional guide. The effort of instructional leadership to provide resources for the implementation of curriculum results students improved academic achievement (Valentine & Prater, 2011).

### **Effect of instructional leadership on student achievement**

There are various studies which provide evidence that instructional leadership shows relationship between instructional leadership of head teachers and achievement of the students.

Heck et al (1990) tested a causal model to measure the influence of school principals instructional leadership behaviors on student achievement in secondary schools. They collected data from 322 teachers and 56 principals. The study found significant effect of instructional leadership behaviors on student achievement. Knezek (2001) in his mixed methods research also explored that instructional leadership influences the school outcomes. Witziers et al. (2003) conducted a study to find out the effect of the instructional leadership on learning outcomes of students. The study examined the extent to which head teacher could directly affect the student achievement. The positive effects were determined in their study that confirmed previous study findings on the direct effects approach to connecting leadership with learner outcomes. The study of O'Donnell and White (2005) focused on investigating relationship between principals' instructional leadership behaviors and student achievement. The findings indicated that teachers' perceptions of head teacher behaviors were determined as the predictors of student outcomes and they improved school culture and student achievement.

Ross and Gray (2006) conducted a study to measure head teachers' contribution to student outcomes. The researchers selected 205 elementary school principals to get their perceptions. The study revealed the significant relationship between the leadership about instruction and their student performance. Robinson et. al. (2008) measured the impact of various leadership style on students' academic and non-academic outcomes and conducted a meta-analysis study. The findings based on the analysis demonstrated that instructional leadership significantly affected student outcomes, even three to four times more than the transformational leadership practices.

The study of Hanna (2010) explored five factors such as learning, vision, leadership, communication, and accountability. The study found the student achievement was predicted through instructional leadership. Louis, et al., (2010) conducted aimed at recognizing the successful educational practices and student attainment. The study explored that instructional leadership involves different quality practices affect the student learning positively. Lee et al. (2012) examined the effect of different dimensions of instructional leadership on student learning in Hong Kong. They collected data from 2037 students and their teachers in 42 secondary schools. Hierarchical linear modeling was used to analyze the data. The study found that leadership practices enhanced student learning by increasing their involvement in academics.

A research study conducted by Shatzer et al. (2014) investigated the effect that school leaders have on the student learning and selected teachers as a sample in the United States. Teachers rated their head teachers as instructional leaders and demonstrated their effectiveness as instructional leaders. Student achievement score was taken on a criterion referenced test. The study revealed that instructional leadership of head teacher significantly affected the student outcomes.

Mitchell et al. (2015) examined the effect of instructional leadership on student outcomes and school academic press. The study explored that instructional leadership and academic press explained 84% of the variance in student outcomes. Day et al. (2016) investigated how successful leaders combine transformational leadership and instructional leadership with focusing on measuring the effect of instructional leadership style on students' outcomes. They conducted a 3 years longitudinal mixed-methods study in 20 schools. The results showed that those various factors including transformational leadership impact students' outcomes depending on the contexts, teacher trainings and development.

Alam and Ahmad (2017) examined the effect of instructional leadership, with various other independent variables, on student achievement in Pakistan. The sampled 214 teachers from 88 primary schools. Based on the hierarchical regression analysis, the study found significant effect of instructional leadership on students' achievement with mediating effect of teacher commitment. It means, if the teacher commitment is increased, the instructional leadership affects more on student achievement. They also discussed that teachers should not be involved non-teaching responsibilities as they hinder them from their work as their commitment lowers down.

Gray (2018) examined relationship between the instructional leadership skills or practices and student achievement in high-poverty schools in the Northwest Tennessee, USA. The study revealed significant relationship between the instructional leadership skills and student outcomes. Hou et al. (2019) investigated the effect of instructional leadership involving defining school goals, teachers' professional development, managing instruction, and maintaining relations on student achievement. The study found the relationship between both student outcomes and instructional leadership and student results were also predicted through instructional leadership.

Hou (2019) conducted a quantitative research study to examine the impact of instructional leadership on academic achievement of high school students in China. The sample included 26 principals and 4288 students. Based on hierarchical linear modeling analyses, the researchers found moderate positive effect of instructional leadership on student academic achievement.

Kwan (2020) examined the moderating effect of transformational leadership on student outcomes while focused on measuring the effect of instructional leadership on student outcomes in Hong Kong. The findings based on the data collected from 177 school principals, showed the significant effect of instructional leadership on student outcomes

with moderating effect of transformational leadership. The implications of the study included transformational leader's behavior and the situation of the school contexts. Various other studies found that instructional leadership as the predictor of student outcomes (Hattie, 2015; Heck, Larsen, & Marcoulides, 1990; Jacobson, 2011; Miller, Goddard, Goddard, Larsen, & Jacob, 2010; Nettles & Herrington, 2007; Troutman, 2012; Valentine, & Prater, 2011).

### Conceptual Framework Of The Study

A conceptual framework is the interlinked set of ideas or theories about how specific phenomenon or functions is interlinked to its parts. The framework provides as the basis for understanding the co relational of interconnections events, observations, ideas, concepts, interpretations, knowledge, and other aspects of experience. Figure 1 shows the interrelationship between the factors of instructional leadership and student achievement in Physics, Chemistry and Biology in 10th grade.

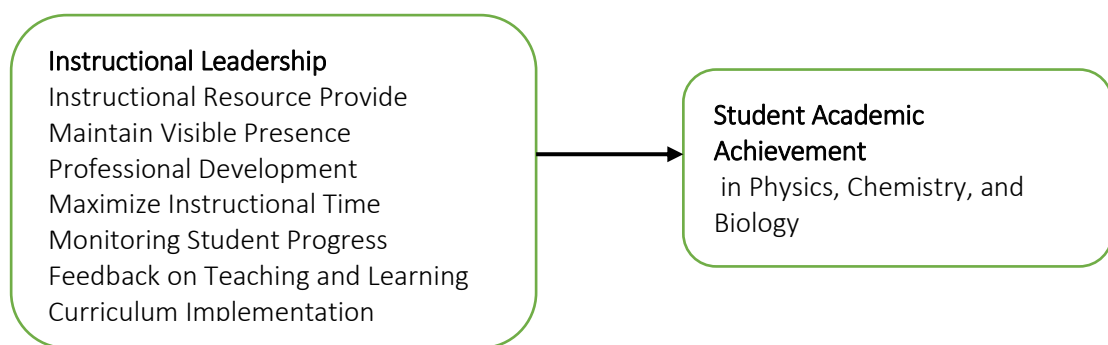


Figure 1: Conceptual Framework of the Study

### Material and Methods

This study involves positivism philosophical paradigm that recognizes that the knowledge which can be tested and verified scientifically with reasons, logical, based on sensory experiences or mathematical proof, and (Comte, 2015). All secondary school teachers who taught Physics, Chemistry, and Biology to 10<sup>th</sup> graders in 2022 and their students of these subjects in Baluchistan province constituted population of the study. According to Baluchistan Education Statistics 2016-17, there are 964 public secondary schools in province Baluchistan.

Multistage sampling technique was adopted to gather data for the present study. Initially, 20 percent of the districts (6 out of 31) in Baluchistan were sampled randomly, using the lucky draw system. The sampled districts were Quetta, Pishin, Sibi, Lasbela, Killa Abdullah, and Chaman. Later on, the researcher randomly selected 20 percent boys and 20 percent girls' secondary schools from these 6 sampled districts. Lastly, all science teachers who taught Physics, Chemistry, and Biology, to 10th graded 2021-2022 constituted the sample of study. The students of these sampled teachers were also sampled. The total number of schools was 122, total number of teachers was 388, while the total number of available students was 2797.

**Table 1**  
**Demographics Variables**

Demographics	f(percent)
Number of Schools	
Boys	52(42%)
Girls	70(58%)

Total	122(100%)
Number of Teachers	
Male	180(46%)
Female	208(54%)
Total	388(100%)
Number of Students	
Boys	1245(45%)
Girls	1552(55%)
Total	2797(100%)

### Instrumentation

This study used a questionnaire which was developed by Akram et al. (2017) and used on the sample taken from Punjab, Pakistan. The ILQ includes 42 items with 7 factors namely. The overall reliability of ILQ was found to be .95. The response system asking head teachers frequency of behaviors were as 1) Never, 2) Rarely, 3) Sometimes, 4) Often, 5) Always. The ILQ was pilot-tested on 30 science teachers of different schools so get their perceptions about the clarity of the language, and validity related issues. Minor typographical mistakes highlighted by the experts were corrected before final data collection. The pilot study results shows that ILQ was reliable in Balochistan context as we; with Cronbach alpha as .76.

### Data Collection

The data were collected in 2022. First of all, the first researcher visited the sampled schools in all 6 districts, met the head teachers and science teachers of the school, sought consent of the teachers to participate in the study, and gave them Instructional Leadership Questionnaire (ILQ) to be completed by them. Besides, achievement scores of all these sampled students in Physics, Chemistry, and Biology on the Board of Intermediate and Secondary Education Examination in 2022 were collected from their school record with the permission of their class in-charge. In this way, the researcher was able to collect data from 388 teachers and 2790 students. All ethical concerns such as consent and the confidentiality of the data were given careful consideration while data were collected. The latest version of SPSS was used for data analysis.

**Table 2**  
**Reliability Analysis: Instructional Leadership Questionnaire (ILQ)**

Factors	Items	( $\alpha$ )
Instructional Resource Provider	1,2,3,4,5,6,7	.80
Maintain Visible Presence	8,9,10,11,12,13	.82
Professional Development	14,15,16,17,18,19,20	.80
Maximize Instructional Time	21,22,23,24,25,26	.82
Monitoring Student Progress	27,28,29,30	.84
Feedback on Teaching and Learning	31,32,33,34,35	.82
Curriculum Implementation	36,37,38,39,40	.78
Overall Reliability	1 to 40	.84

Table 2 shows the coefficient reliability value for Instructional leadership Questionnaire. According to the data, the highest reliability was found for Monitoring Student Progress ( $\alpha=.84$ ), followed by Maintain visible presence ( $\alpha=.82$ ) and Feedback on teaching and learning ( $\alpha=.82$ ), while the lowest reliability value was found for Curriculum Implementation ( $\alpha=.78$ ). In overall Instructional Leadership Questionnaire was found to be highly reliable ( $\alpha=.92$ ).

## Results and Discussion

**Table 3**  
**Descriptive Statistics: Instructional Leadership Practices of Head Teachers**

Factors	Min	Max	M	SD
Instructional Resource Provider	7.00	35.00	23.54	3.445
Maintain Visible Presence	6.00	30.00	23.33	4.543
Professional Development	7.00	35.00	21.38	3.452
Maximize Instructional Time	6.00	30.00	23.18	4.880
Monitoring Student Progress	4.00	20.00	22.64	3.420
Feedback on Teaching and Learning	5.00	25.00	21.65	4.442
Curriculum Implementation	5.00	25.00	23.80	4.332
Overall	40.00	200.00	145.44	5.120

Descriptive statistics were calculated to analyze teachers' perceptions of their instructional leadership practices of their head teachers. According to the data, the highest mean score was found for Curriculum Implementation ( $M=23.80$ ,  $S.D.=4.332$ ), followed by Instructional Resource Provider ( $M=23.54$ ,  $S.D.=3.445$ ), Maintain Visible Presence ( $23.33$ ,  $S.D.=4.542$ ), and Maximize Instructional Time ( $M=23.18$ ,  $S.D.=4.880$ ). The overall mean score on instructional leadership was found high as ( $M=145.44$ ,  $S.D.=5.120$ ). Combining to the results, the study showed that teachers *agreed* that their head teachers practiced instructional leadership practices in their schools.

**Table 4**  
**Relationship between Instructional Leadership Practices and Student Achievement in Physics, Chemistry, and Biology**

Factors	Physics (r)	Chemistry (r)	Biology (r)
Instructional Resource Provider	*.60	*.55	*.62
Maintain Visible Presence	*.60	*.57	*.61
Professional Development	*.51	*.51	*.53
Maximize Instructional Time	*.56	*.58	*.64
Monitoring Student Progress	*.66	*.59	*.65
Feedback on Teaching and Learning	*.61	*.58	*.63
Curriculum Implementation	*.62	*.60	*.67
Overall Relationship	*.68	*.64	*.70

According to Table 4, moderate positive relationships were found for all the factors of instructional Leadership and student achievement in Physics, Chemistry, and Biology. For Physics, the highest relationship was revealed between Monitoring Student Progress and achievement in Physics ( $r=.66$ ), followed by Curriculum implementation and Physics achievement ( $r=.62$ ), while the lowest moderate positive relationship was revealed between Professional Development and Achievement in Physics ( $r=.51$ ) with overall moderate positive relationship between instructional leadership and Physics achievement ( $r=.68$ ).

For Chemistry, the highest moderate positive relationship was found between Curriculum Implementation and achievement in Chemistry ( $r=.60$ ), followed by Monitoring Student Progress and Achievement in Chemistry ( $r=.59$ ), while the lowest moderate positive relationship was revealed between Professional Development and achievement in Chemistry ( $r=.32$ ) with overall moderate relationship ( $r=.64$ ).

For Biology, curriculum implementation and student achievement in Biology found highest moderate relationship ( $r=.67$ ) and monitoring student progress and achievement in Biology ( $r=.65$ ), with overall moderate relationship between Instructional Leadership and Biology achievement of the students ( $r=.70$ ). The lowest relationship was found between



Professional development and student achievement in Biology ( $r=.53$ ). Comparatively, higher relationship was revealed between instructional leadership and student outcomes in Biology as compared to Chemistry and Physics.

**Table 5**  
**Multiple Regression Analysis: Effect of instructional Leadership on Student Achievement in Physics**

Model	Sum of Square	df	Mean Square	F	Sig.
Regression	15849.816	7	2264.259	182.868	.000
Residual	13496.309	2790	12.382		
Total	29346.125	2797			

$R=.68$ ,  $R^2=.46$

Multiple regression analysis was employed to measure the effect of instructional leadership on student achievement in Physics. According to Table 5, the result revealed that all seven factors of instructional leadership significantly predict 46 percent of variance in student achievement in Physics ( $R^2=.46$ ,  $F(7,2790)=182.868$ ,  $p=.000$ ).

**Table 6**  
**Multiple Regression Analysis: Effect of instructional Leadership on Student Achievement in Chemistry**

Model	Sum of Square	df	Mean Square	F	Sig.
Regression	13988.330	7	1998.333	294.814	.000
Residual	7388.334	2790	6.778		
Total	21376.664	2797			

$R=.64$ ,  $R^2=.41$

Multiple regression analysis was run to measure the effect of instructional leadership on student achievement in Chemistry. According to Table 6, the result revealed that all seven factors of instructional leadership significantly predicted 41 percent of variance in student achievement in Chemistry ( $R^2=.41$ ,  $F(7,2790)=294.814$ ,  $p=.000$ ).

**Table 7**  
**Multiple Regression Analysis: Effect of instructional Leadership on Student Achievement in Biology**

Model	Sum of Square	df	Mean Square	F	Sig.
Regression	109709.195	7	15672.742	378.231	.000
Residual	45166.264	2790	41.437		
Total	154875.458	2797			

$R=.70$   $R^2=.49$

Multiple regression analysis was run to measure the effect of instructional leadership on student achievement in Biology. According to Table 7, the result revealed that all seven factors of instructional leadership significantly combined to predict 49 percent of variance in student achievement in Biology ( $R^2=.49$ ,  $F(7,2790)=378.231$ ,  $p=.000$ ).

## Conclusion

This study was conducted to find out the effect of instructional leadership practices on students' achievement in the subjects of Physics, Chemistry, and Biology. Study findings reveal that instructional leadership is correlated and effective for students' achievement in science subjects at secondary level. Study findings are consistent with Villa, and Tulod (2021) and Ma, and Marion (2021). Head teachers who practice and do the role of instructional leadership as instructional resource provider and maintaining visible presence in the school during teaching hours are more effective for science students to have

improved academic achievement. This finding is consistent and supported by Rodrigues, and Ávila de Lima (2021) and Shaked (2021).

Grissom, Egalite, and Lindsay (2021) suggested that school head should be curriculum implementer and feedback provider to the teaching staff. This action would finally improve students' academic achievement. If a school head is playing the role of instructional leader, he/she would be a resource provider which is facilitation for teachers to teach well and students to learn effectively. These findings are supported by Liou (2021) and Audia and Greve (2021).

Villa, and Tulod (2021) and Ma, and Marion (2021) revealed the positive and significant relationship between instructional leadership and students' academic achievement. Head teachers who practice and do the role of instructional leadership as instructional resource provider and maintaining visible presence in the school during teaching hours are more effective for science students to have improved academic achievement. This finding is consistent and supported by Rodrigues, and Ávila de Lima (2021) and Shaked (2021). Study reveals that instructional leaders who manage teachers' professional development, provide maximum instructional time, monitor students' progress, and provides feedback on teaching and learning tasks, and implement curriculum might improve students' academic achievement in science subjects. Same findings are revealed by Louis and Leithwood (2021).

Instructional leadership is effective for science students to have improved scores in their science subjects. Grissom et al. (2021) suggested that school head should be curriculum implementer and feedback provider to the teaching staff. This action would finally improve students' academic achievement. If a school head is playing the role of instructional leader, he/she would be a resource provider which is facilitation for teachers to teach well and students to learn well. Instructional leader ensures visible presence in his teaching staff for the provision of any professional help and support for effective teaching which ultimately would result improved academic achievement. These findings are supported by Liou (2021) and Audia and Greve (2021).

Louis and Leithwood (2021) recommended instructional leadership practices in school for improved achievement in the subjects of science.

Positive relationship between secondary school students' academic achievement in science subjects and instructional leadership practices is consistent with Villa, and Tulod (2021) and Ma, and Marion (2021). Both studies also revealed that instructional leadership enhances students' academic achievement, especially, in science subjects. Instructional leadership ensures improved instructional activities in the school and it results improved students' academic achievement. So, the academic achievement in science subjects has been predicted by instructional leadership.

Studies of Erlangga et al. (2021) and Leithwood and Louis (2021) reveal that instructional leadership is effective for students' achievement in the subject of Physics. Instructional leadership in schools ensures availability of instructional resources, active feedback on instructional problems, implements curriculum designed for grade and school level which results improved academic achievement in science subjects like Physics, Chemistry, and Biology. Similar findings are given by Leithwood, and Louis (2021) supporting the idea of improved academic achievement in the subject Physics due to the effectual instructional leadership practices in schools.

Studies Liou et al. (2021) and McCray et al. (2021) revealed that there is positive relationship between instructional leadership practices and students' achievement in the subject of Chemistry. Chemistry subject which falls in the domain of pure science and its achievement is called science achievement is supported by Acton (2021). It recommends

instructional leadership for effective academic achievement in the subject of Chemistry. Students would have improved performance in Chemistry if they experience instructional leadership practices in their school. These findings are further assisted by Grissom et al.

### **Recommendations**

On the basis of study findings, following recommendations are stated:

1. Head teachers of secondary school are recommended to practice instructional leadership at secondary school level to improve science students' academic achievement in the subject of Physics, Chemistry, and Biology.
2. Further studies may be conducted to measure the effect of instructional leadership on student achievement in other districts of Balochistan.

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