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Lesson Study Model versus Traditional Methods of Teaching: Effects on Prospective Teachers' Instructional Practices and Students' Achievement

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Abstract

This study aimed to compare the Prospective Teachers' (PTs) instructional practices and students' academic performances based on the practice of Lesson Study (LS) model and traditional methods of teaching. This study also evaluated the effectiveness of LS model in improving PTs' instructional practices and students' academic performance. It was a quantitative study and a post-test-only control group design was utilized in this research. 19 Prospective Teachers (PTs) of the BS (Hons) education program and 2576 students of 6th and 7th grade (1288+1288) constituted the population of the study. A stratified sampling technique was used to select 4 institutions. A simple random sampling technique was used to select 4 sections (of grades 6th and 7th) and the total number of students in these sections was 134. The purposive sampling technique was used to select eight PTs for the experimental group (4+4) and two PTs for the control group (1+1) keeping in view the similarity of subject and class. Major data collection tools were observation sheets and class tests. The data collection process was based on the duration of 10 weeks. For data analysis, mean scores, values of t-test, and hedges g formula were calculated. Results of the study showed a significant difference in the instructional practices of teachers and the academic performance of students based on utilizing the LS model and traditional ways of teaching. It was recommended that initiatives may be taken by teacher educators and schools administrators to practice the LS model during the training of PTs.

Keywords: Instructional Practice, Prospective Teachers, Academic Performance, Schools' Students, Lesson Study Model, Traditional Method of Teaching

Introduction

The complex nature of the teaching profession demands a lot of expertise from teachers that

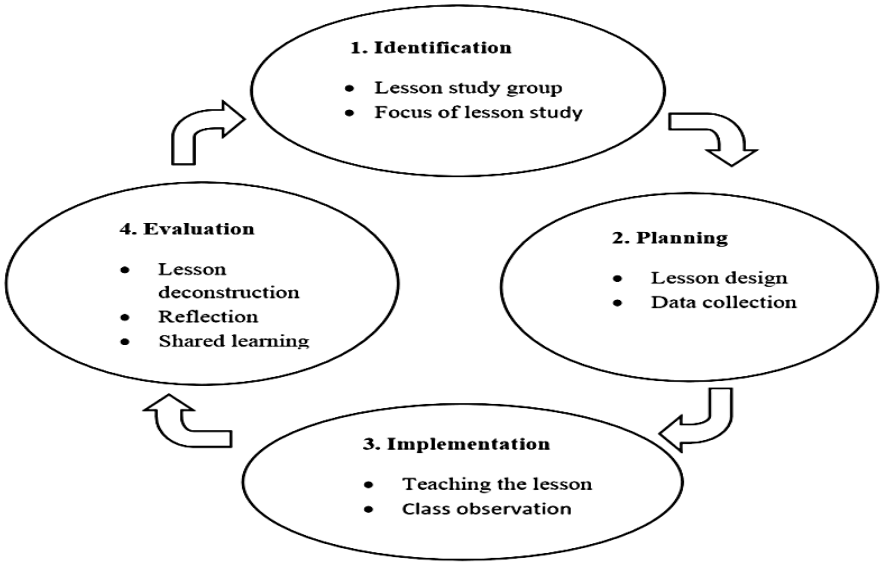
why preparing Prospective Teachers (PTs) for the upcoming situation in a considerable way must be the top priority of teacher educators (Remillard & Bryans, 2004). In the majority of cases, PTs are practicing traditional teaching methodologies during their internships (teaching practice). Due to this, generally, they face challenges related to diverse students' behavior and work-life imbalance (Hudson, 2012). Therefore, it has been endorsed by Loughran (2014) that creating a link between teaching and learning is of quite an importance. And this argument necessitated the need of arranging such kinds of activities during the teaching practice (practicum) of PTs that may provide them ample opportunities of practicing learned knowledge in the real environment during teaching to ensure the better academic performance of students.

Concerning effective teacher training programs for PTs, researchers (Pillen, Beijard, & Den, 2012) explored that the LS model can be effectively utilized to familiarize PTs with emerging pedagogy and ways to deal with management-related issues. LS model may be a timely effort to ensure collaborative interaction among PTs and experienced teachers as well as for developing the habit of experiences sharing among teachers with the major aims of producing effective teachers (Lucenario, Yangco, Punzalan, & Espinosa, 2016). Furthermore, this model can also assist them to strengthen their lesson planning, and assessment-related capabilities (Aimah, Ifadah, & Bharati, 2017). Similarly, it has been endorsed by Murata (2011) that the LS model offers opportunities for teachers to discuss the academic performance of students as well as their way of responding in classrooms. Therefore this model can strengthen their strong collegial interaction-related competencies to improve their instructional practices in a very positive manner.

Besides it, Cerbin and Kopp (2006) explored that practice of the LS model can offer multiple opportunities for prospective as well as experienced teachers to upgrade their pedagogical content knowledge with the ultimate aim of improving their instructional practices and academic performance of students in the future. Besides it, researchers (Greene, Caracelli, & Graham, 1989) also highlighted the need of bridging the theory-practice gap during the professional development activities of prospective teachers. Lewis, Perry, Foster, Hurd, and Fisher (2011) also indicated that LS model can fulfill the expectations of prospective teachers by enabling them to bridge theory practice gap Therefore, keeping in view above mentioned arguments, this study has been designed to explore the difference among teachers' instructional practices and students' academic performance based on practicing LS model and traditional methods of teaching. In present study the model of LS presented by McSweeney and Gardner (2018) was practiced by PTs with the help of cooperative teachers and researcher for teaching students during teaching practice.

Figure 1

Selected LS Model for Practice



Purpose Statement and Objectives

This study aimed at evaluating the effectiveness of LS model in improving Prospective Teachers' (PTs) instructional practice and students' academic performance. For exploring the effectiveness of LS model, instructional practices of PTs who practiced LS model for teaching were compared with the instructional practices of those PTs who were teaching through traditional methods (i.e. focusing on lecture method and doing individual teaching). Likewise, the effectiveness of LS model was further explored by comparing students' academic performance based on the practice of LS model and traditional methods. For achieving the purpose of the study, two research hypotheses were formulated, which are as follows:

H_{A1} Instructional practices of PTs (teaching the subjects of geography and computer) are significantly different based on the practice of the LS model and traditional methods of teaching

H_{A2} Academic performance of students (studying the subjects of geography and computer) are significantly different on the basis of practicing LS model and traditional methods of teaching

Significance and Delimitations of the Study

Research setting in this study is of quite importance as it took place in the real classroom environment. The findings of this study may prove very beneficial for teacher educators who own the responsibility of ensuring effective professional development facilities for PTs. Besides, PTs themselves will be able to admire the importance of collaborative planning, teamwork, experience sharing, and writing reflection in improving instructional practices, and consequently, they will be able to practice these competencies throughout their teaching career. The findings of this study will also motivate educational administrators at the school level to encourage the practice of LS model for improving the instructional practices of their teachers. Ultimately, the chief beneficiaries will be the students who will receive adequate instructions and will be able to produce better academic performance which is the ultimate

aim of LS model.

This study was delimited to PTs of BS (Hons) education program, who were enrolled at International Islamic University Islamabad (IIUI) in the session of Spring2017-Spring2021 and students of two Islamabad Model Colleges for Girls (IMSGs) and one Islamabad Model School for Girls (IMSG), where required number of PTs for the experimental and control group were available.

Literature Review

The idea of practicing LS model has been initiated by Japanese teachers in 1978 and this model was practiced firstly at a Japanese normal school. According to Arani, Fukaya, and Lassegard (2010) basic purpose of practicing this model was to upgrade teachers' competencies for dealing with classroom management issues. Initially, it was termed as jugyo kenkyu (English translation: the study of instruction) and its major focus was ensuring interaction between teacher educators and prospective teachers for a longer period (Lewis, Perry, & Hurd, 2009). Besides Japanese teachers; English researcher and writer Dudley (2012) also conducted extensive research studies to explore its effectiveness concerning improved instructional practices of teachers. Though the basic version of LS model was developed by Stigler and Hiebert (1999) until now various versions of this model have been developed and analysis of these versions reflected that basic steps in LS model are planning, teaching, reviewing, and reteaching. Cerbin (2011) highlighted that the key benefit of LS model is the involvement of three to six teachers in planning, drafting, delivering, evaluating, and improving lessons.

Teaching by practicing LS model is considered an innovative method, as this model encourages active collaboration among teachers to take initiatives for providing an effective learning environment to students (Sibbald, 2009). But in Pakistan dilemma is that; during the professional development of PTs traditional pedagogical strategies are being practiced and opportunities for PTs professional development are not aligned with emerging trends (Jumani, Malik, & Amin, 2018). It has been claimed by researchers (Broughton, Brumpit, Pincas, & Wilde, 2002) that in traditional teaching methods; the major focus is emphasized on delivery of instruction by teachers and attention is not being paid towards ensuring active participation of students. Besides it, McGehee (2021) also indicated that traditional methods of teaching emphasized less on effective student-teacher interaction, the flexibility of students' activities, and ensuring students' interest.

Various research studies have been conducted to explore the effects of LS model and traditional methods of teaching on teachers' instructional practices as well as students' academic performance.

Conceicao, Baptista, and Ponte (2021) as a result of a research study which was conducted to explore the effectiveness of LS model indicated that practice of this model develops the ability to utilize multiple audiovisual aids among teachers for making instructions effective. Ayra and Kostereliogl (2021) also conducted a quasi-experimental study and explored that those teachers and students who were placed in the experimental group for teaching and evaluating by practicing the LS model performed better as compare to those who were placed in the control group and taught by traditional/routine methods. Intaros and Inprasith (2019) as a result of practicing LS model with the help of in-service and PTS indicated that LS model

motivates teachers to utilize a variety of audiovisual aids and this action of teachers play a contributive role in improving concepts clarification and students' academic performance. Similarly, McSweeney and Gardner (2018) also explored that the practice of LS model at educational institutions can play an imperative role in improving teachers' instructional practices and students' academic performance. Similar, researchers (Saye, Kohlmeier, Howell, McCormick, Jones, & Brush, 2017) also indicated that the practice of LS model as compared to traditional methods can improve teachers' practices for ensuring dynamic participation of students in the classroom activities and it is a positive sign of improved students' academic performance.

Likewise, Regan, Evmenova, Kyrz, Hughes, Sacco, Ahn, and Chirinos (2016) also explored that practice of LS model during teaching can upgrade teachers' competencies regarding lesson planning, implementation, and assessment to a great extent. Researchers (Leavy & Hourigan, 2016) also explored that participation in the practice of LS model is beneficial not only for improving the instructional practice of teachers but can also upgrade students' academic performance as well. In the area of teacher education, Hamzeh (2014) conducted an experimental study and placed 12 PTs in LS group (experimental group). Study results indicated that Teachers who taught by practicing LS model have a high level of self-efficacy as compared to teachers who were not teaching by practicing LS model. In the same context, Lucas (2014) as a result of a mixed-methods research study also described that teachers who taught by practicing LS model create effective learning experiences for students as compared to those who were not practicing that model during their teaching.

Research Methodology

Philosophical Assumptions and Research Design

In this study, the researcher followed the philosophical assumptions of pragmatism philosophy as it motivates researchers to utilize multiple data collection tools, focus on practical implications of research and conduct the research in such a way/setting that can address the research problem effectively (Creswell & Poth, 2013). This study was quantitative and a post-test-only control group design was utilized in this research as it allows the researchers to divide the sample into two groups (experimental and control). In this design, the researchers provide the treatment to the experimental group and after the completion of treatment, data are collected from outcome measures (Frey, 2018). PTs who taught by following LS model were taken as experimental group and the PTs who taught following traditional methods of teaching were taken as control group.

Population and Sample

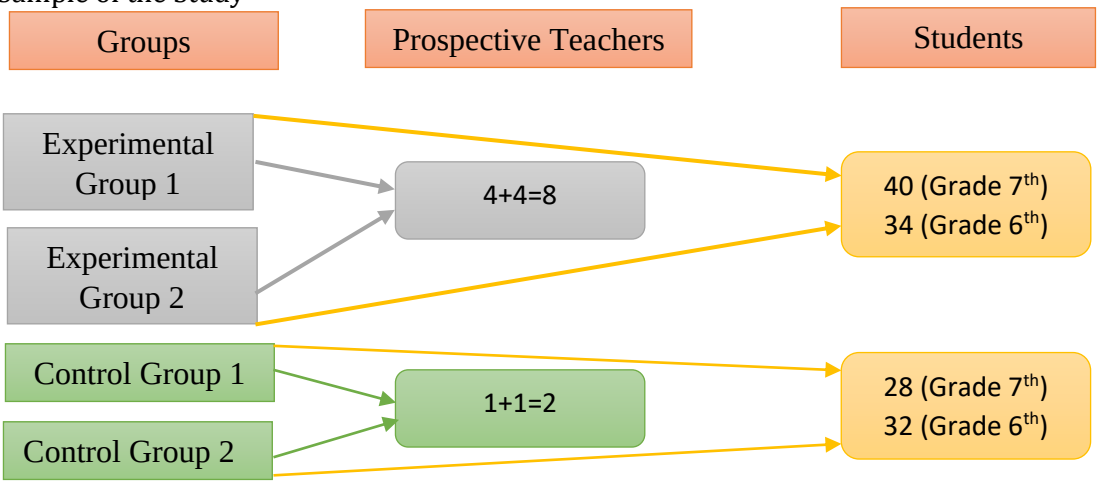
The population of the study consisted of 19 Prospective Teachers (PTs) of BS (Hons) education program enrolled at education department of International Islamic University, Islamabad, and placed at eight Islamabad based colleges and schools[1] for internship (which was their degree requirement and took place during final semesters for four months) and 2576 students of 6th and 7th grade (1288+1288) who were enrolled at these colleges and schools. A stratified sampling technique was used to select 4 institutions[2] (two where the required number of PTs were available to form LS group and two where PTs were teaching the subject selected by LS groups through traditional methods). Group 1 decided to teach the

topic of "mountains and plateaus" from the geography subject of grade 7th and group two decided to teach the topic of "ICT fundamentals" from the computer education subject of grade 6th. These topics were decided on the basis of challenging content and possibility of utilizing multiple audio visual aids as well as teaching strategies.

The purposive sampling technique was used to select eight PTs for the experimental group (4+4) and two PTs for the control group (1+1) keeping in view the similarity of subject and class. For selecting students "rule of thumb" formula presented by John Curry (1984) was applied and according to it, if the total population consist of individuals from 1001-5000 then 5% of them can be selected as sampled individuals. Therefore, a simple random sampling technique was used to select 4 sections (of grades 6th and 7th) and the total number of students in these sections was 134. Graphical representation of study sample has been given in Figure 2:

Figure 2

Sample of the Study



Research Instruments

Major data collection tools were observation sheets that were developed by the researcher with the help of experts to explore the instructional practices of PTs and class tests that were developed by researcher with the help of PTs. Major themes that were included in observation sheets were skills related to lesson planning, presentation, utilization of innovative pedagogical techniques, teacher-students interaction, utilization of audio-visual aid, and students assessment. Class tests[3] that were developed for students of 6th and 7th grades included MCQs, fill in the blanks, labeling items, and short question answer.

Data Collection

For practicing LS model with PTs, formal permissions were taken from supervisors of PTs (who were supervising them at university and colleges/schools). With the permission of university supervisors, researcher arranged a meeting with PTs and briefs them about the process of LS model. Likewise, with the permission of colleges/schools' principals, researcher

arranged a meeting with cooperative teachers (who were monitoring PTs performance at schools) and briefed them about the real essence of LS model, and request them to provide the required assistance to PTs wherever they get stuck. The schedule and detail of meetings are as follows:

Weeks	Description of Tasks/Activities
Week 1	Meetings were arranged with the supervisor for getting their permissions
Week 2	Meetings were arranged with PTs and cooperative teachers for briefing them about the process of LS model
Week 3	PTs of experimental groups identified the topics that they found challenging for teaching
Week 4	PTs teaching the topics (selected by experimental groups) were identified as the control group and they were briefed that when they will teach those specific topics to students, their observation will be carried out and in the next class a test of selected topics will be taken from their classes
Week 5	A meeting with the PTs of experimental groups was arranged and a template for developing lesson plans was decided/developed and they were directed to start work on planning lessons. They were also instructed that wherever they face any difficulty they can get help from researcher and cooperative teachers.
Week 6	PTs of experimental groups finalized their first drafts of lesson plans
Week 7	PTs of experimental groups presented their 1st drafts of lessons and observations were carried out by cooperative teachers, fellow prospective teachers, and researcher
Week 8	PTs of the control group presented their lessons and observations were carried out. Meanwhile, a meeting with PTs of experimental group was arranged and results of observation were addressed to finalize the lesson drafts
Week 9	PTs of the experimental group presented their final lessons and class tests of the classes taught by PTs of the control group were conducted.
Week 10	Class tests of the classes taught by PTs of the experimental group were conducted. And class tests were evaluated with the help of PTs from both groups.

Data Analysis and Interpretation

In this study, two experiments were conducted with teachers of experimental and control groups; who were teaching the subjects of geography and computer education. Group-wise data analysis has been presented in this section. Firstly, teachers' instructional practices were compared for the subjects of geography and computer education; afterward students' academic performances were compared regarding both subjects. These comparisons were made based on practicing LS model for teaching both selected subjects (by experimental groups) and practicing traditional methods of teaching for teaching these subjects (by control group). Detailed analysis of data and interpretation is as follows:

Table 1

Instructional Practices of PTs (for the subject Geography)

Groups	*Control Group*	*Experimental Group*
Major Indicators	Mean Scores	

Lesson Planning	1.25	2.35
Lesson Presentation	1.71	3.00
Application of Teaching Methods	2.17	3.00
Interaction with Students	1.67	2.83
Use of Audio-Visual Aids	1.00	2.37
Assessment related Competencies	2.00	3.00

The range for the interpretation of mean scores was used for making the comparison in the instructional practices of PTs. This range indicated that if the value of mean scores is in the range of 1.00-1.66 then it must be categorized in the category of low. If the value of mean scores is in the range of 1.67-2.33, then it will be categorized in the category of average; and if the value of mean scores is in the range of 2.34-3.00 then it will be categorized in the category of high (Alotaibi, Almasari, Alkadam, Alanazi, & Al Gahtani, 2017). Data presented in table 1 reflected that mean scores of that PT who was placed in the control group for the skills related to lesson planning and use of audio-visual aids were in the category of low mean scores, while mean scores of the control group for the skills related to lesson presentation, application of teaching methods, interaction with students, and assessment were in the category of average mean scores. While if we look towards the mean scores of that PT skills (related to instructional practices) who taught by practicing LS model (and was placed in the experimental group) were in the category of high mean scores.

Table 2

Instructional Practices of PTs (for the subject Computer Education)

Groups	*Control Group*	*Experimental Group*
Major Indicators	Mean Scores	
Lesson Planning	1.25	2.75
Lesson Presentation	1.57	2.86
Application of Teaching Methods	1.17	3.00
Interaction with Students	1.50	2.50
Use of Audio-Visual Aids	1.50	3.00
Assessment related Competencies	2.00	2.67

Data presented in table 2 reflected that mean scores of that PT who was placed in the control group for the skills related to all competencies of instructional practices were in the category of low mean scores (1.00-1.66) except the assessment related competencies as the mean scores for that competency were in the category of average (1.67-2.33). While if we look towards the mean scores of that PT skills (related to instructional practices) who taught by practicing LS model (and was placed in the experimental group) were in the category of high mean scores (2.34-3.00). Therefore, based on the above-mentioned data, it can be stated that there is a significant difference in the instructional practices of the control and experimental group.

Table 3

Academic Performance of Students (in the subject Geography)

Groups	*N*	*Mean Scores*	*Standard Deviation*	*t value*	*df*	*p-value*	*Hedges' g value*
Control Group	25	8.44	3.21	-.483	58	0.63	0.12

Experimental Group	35	8.91	4.08

Significance Level: 0.5

Results of Table 3 indicated that mean scores and standard deviation of the control group (M=8.44, SD=3.21) and experimental group (M=8.91, SD=4.08) are statistically different. While values of t and p also indicated that t(58)= .483, p=0.63 students of the experimental group in the subject of geography performed better as compare to students of the control group. While the value of hedges' g (0.12) indicated a small difference in the performance of the control and experimental group.

Table 4

Academic Performance of Students (in the subject Computer Education)

Groups	*N*	*Mean Scores*	*Standard Deviation*	*t value*	*df*	*P-value*	*Hedges' g value*
Control Group	28	19.07	6.07	-.396	52	0.69	0.10
Experimental Group	26	19.73	6.14				

Significance Level: 0.5

Results of Table 4 indicated that mean scores and standard deviation of the control group (M=19.07, SD=6.07) and experimental group (M=19.73, SD=6.14) are statistically different. While values of t and p also indicated that t(52)= .396, p=0.69 students of the experimental group in the subject of computer education performed better as compare to students of the control group. The value of hedges' g (0.10) indicated a small difference in the performance of the control and experimental group.

Discussion

Results of the present study indicated that PTs who taught by practicing LS model performed better regarding the skills of lesson planning, lesson presentation, utilization of innovative teaching strategies, maintaining interactions with students, utilization of audiovisual aids, and the practice of innovative assessment techniques. Present study' findings are aligned with the results of previous studies conducted by renowned researchers. Such as Cerbin and Kopp (2006) indicated that the practice of LS model can contribute a lot in supporting teachers to upgrade their pedagogical content knowledge and these improved skills can upgrade PTs lesson planning and lesson presentation skills to a great extent. As in the present study, researcher explored that PTs were able to practice their learned knowledge (during course wok) in the classroom effectively; it has been also endorsed by Greene, Caracelli, and Graham (1989) that the practice of LS model is a great opportunity to bridge theory-practice gap in PTs professional development.

As in this study, researcher explored that with the help of fellow teachers PTs were able to build effective interaction with students and there were no management related issues; it has been also argued by Arani, Fukaya, and Lassegard (2010) that the practice of LS model support PTs a lot to deal effectively with management related issues. PTs have remained engaged with cooperative teachers as well as university teachers for practicing LS model, and this practice has been supported by Lewis, Perry, and Hurd (2009) who indicated that the purpose of practicing LS model is to ensure effective interaction between PTs and experienced teachers for a longer duration. PTs were able to create an operative learning environment for students and Sibbbald (2009) also reflected that a major purpose of practicing LS model is to offer an effective learning environment for students' better academic performance. PTs who practiced LS model have utilized multiple audio-visual aids

and it has been also indicated by Conceicao, Baptista, and Ponte (2021) that practice of LS model motivates teachers to utilize multiple audio-visual aids for making their instructional practices effective.

PTs who were teaching by practicing traditional methods were focusing much on lectures than classroom activities and it has been also described by Broughton, Brumpit, Pincas, and Wilde (2002) that in traditional teaching methods major focus is emphasized on delivery of instruction by teachers and less attention is being paid towards ensuring active participation of students. Academic performance of students was significantly different in the subject of geography and computer based on the practice of LS model and traditional methods of teaching. Previous research studies conducted by well-known researchers (Leavy & Hourigan, 2016; Saye, Kohlmeier, Howell, McCormick, Jones, & Brush, 2017; Intaros & Inprasith, 2019) also indicated that the practice of LS model can positively contribute to ensuring the better academic performance of students.

Conclusions

The practice of LS model has proved very supportive in improving the lesson planning and lesson presentation skills of PTs. This practice has enabled PTs to apply theoretical knowledge in actual classrooms. With the help of their fellow teachers, PTs were able to maintain effective interaction with students and apply multiple audiovisual aids to make lessons interactive and understandable. Adequate support of cooperative teachers and researcher has motivated PTs to practice innovative teaching and assessment-related techniques. The practice of LS model has not only improved the instructional practices of PTs but has also contributed in providing an effective learning environment for students. Twice presentation of the lesson has contributed a lot in concept clarification of students and as a result, they have performed excellently in classroom tests. It can be concluded that LS (if properly implemented) can play an active role in improving the instructional practices of PTs and academic performance of students.

Recommendations

Teacher education institutions/departments can include LS model as a compulsory part of their teaching as well as internship-related courses. The practice of LS model can be initially done at university with the help of teacher educators for ensuring its successful practice at schools during teaching practice. For practicing LS model with PTs in a real sense; a proper plan/mechanism may be developed by teacher educators with close coordination of schools' principals and cooperative teachers. PTs may be familiarized with a variety of innovative teaching and assessment-related techniques; so that they can make use of maximum teaching and innovative assessment strategies/techniques during the practice of LS model. For ensuring the successful implementation of LS model during the teaching practice of PTs, orientation sessions may be organized for PTs and cooperative teachers. Provision of required audiovisual aids and other facilities (such as room for discussion sessions and practice, equipment for audio/video recording of lessons, etc.) to PTs may be ensured by teacher educators and school administrators for ensuring the practice of LS model in an effective way.

This study was delimited to PTs of one university and for practice only four institutions (two colleges and two school) were selected; future studies may be conducted with a large sample size (concerning PTs and institutions) for providing comparisons and generalizations. In this study, only PTs' instructional practices and students' academic achievement were explored

regarding the practice of LS model; in future studies researchers may explore the effectiveness of LS model regarding other aspects of the teaching-learning process such as efficacy, motivation, confidence, satisfaction level of teachers and students and so on.

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[1] Four IMCGs: Tralai, Bhara Kahu, G-10/2, I-8/4, and 4 IMSGs: G-11/1, G-11/2, I-10/4, F-7/2

[2] For group 1 PTs were selected from IMCG, Tarlai, and IMCG I-8/4.
While for group 2 PTs were selected from IMSG, F-7/2, and IMSG, I-10/4

[3] These class tests also include blanks related to students name, grade, subject, chapter number and name, total marks, and allocated time