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Innovative Information and Communication Technology in Education and Its Potential for Reducing Poverty in the Asia and Pacific Region: Summary of Findings “**Old Technology or New? A Study of Video Recording as an Innovative Method for Primary School Teacher Training in Rural Nepal**”

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Old Technology or New? A Study of Video Recording as an Innovative Method for Primary School Teacher Training in Rural Nepal

Summary of Findings

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I. BACKGROUND TO THE STUDY

1. With the aim of providing Developing Member Countries (DMCs) with better guidance for using information and communication technology (ICT) effectively in education, the Asian Development Bank (ADB) funded a 21-month Regional Technical Assistance (RETA) in Bangladesh, Nepal, Mongolia, and Samoa. The RETA researched approaches to using ICT in education to improve teaching and learning that are not only successful, but also feasible and sustainable given the region's development challenges. The study was implemented by RTI International in partnership with iEARN-USA. "Innovative Information and Communication Technology in Education and Its Potential for Reducing Poverty in Asia and the Pacific Region," commenced in April 2006.

2. Specifically, the study aimed at highlighting promising models of ICT integration and best practices; identifying drivers and barriers to successful ICT integration; and sharing lessons learned, with a specific focus on rural and remote areas. It combined policy analysis, program evaluation (mainly interviews and focus groups), and small-scale activities (professional development and provision of selected ICT resources). The study piggy-backed on existing projects in each of the four participating countries. In Bangladesh and Nepal, those were projects focused on the use of ICT for teacher training, in Mongolia and Samoa, the task was to focus on projects introducing e-Resources (electronic teaching and learning materials) to better reach remote and isolated areas of the country with up-to-date teaching materials. The RETA featured three technical components:

- Policy and Strategy (regional)
- e-Resources (Mongolia and Samoa)
- e-Teacher Training (Nepal and Bangladesh)

3. The study in Nepal focused on the use of digital video recording and laptops as tools in remote teacher training settings. Although VHS video has been around for many years, and has been common in teacher training in some countries since the 1970's, the advent of *digital* recording offers many new possibilities for using video in the classroom, and in developing-country contexts, because of the compact and easily distributed nature of this technology. Therefore, it makes it a particularly suitable tool for remote areas with poor communications infrastructure, such as the mountainous regions of Nepal.

4. The findings from this study¹ will help inform the Nepal National Center for Educational Development (the central teacher education authority, under the Ministry of Education and Sports) about ways to optimize the use of existing, but underutilized, equipment provided to major primary teacher training institutes around the country. Furthermore, the study adds to the existing knowledge base of using video in teacher preparation by providing some practical tips for implementing video recording and playback in the classroom, and providing suggestions for how the use of video can be expanded beyond its traditional use for self-assessment and critique in microteaching, for example:

- Helping to address a lack of material resources for teaching aids
- Using video for whole school supervision and ongoing teacher performance evaluation for certified and serving teachers
- Improving relations between the community and school.

5. The study in Nepal is linked to the existing ADB-funded² Teacher Education Program (TEP), which aims to assist the government to improve the quality and efficiency of and access to basic education through provision of better-qualified teachers. It is made up of the following four components:

- Building an effective and sustainable system for teacher education through strengthening administrative capacity.
- Developing effective teacher education curriculum and teaching-learning materials.
- Training teachers, educational administrators, and managers.
- Educating teachers to better serve the needs of girls and other disadvantaged groups.

6. Under TEP, nine existing Primary Education Training Centers (ETCs) received a computer, LCD projector, and digital video recorder for use in their training hall. ETCs are the coordinating center responsible for private training centers and alternative providers (including mobile teams), teacher certification examinations, oversight and quality control of private schools, including provision of technical support and some materials. ETCs also act as lead resource centers who support village-level centers and train resource persons as part of the radio distance education distance education program (see next paragraph). Therefore ETCs are key institutions in the teacher training network, and a place where the optimal use of technology in teacher training needs to be studied.

7. A major goal of TEP is to clear the backlog of untrained teachers currently serving in the school system, to be in compliance with a government policy that states that all newly recruited teachers must have a minimum qualification of 10 months training beyond the tenth grade School Leaving Certificate (SLC). The current curriculum offered by government teacher-training centers is carried out in three phases: 2.5 months face-to-face, 5 months school-based distance learning, and 2.5 months face-to-face. Because the face-to-face components require trainees to travel to a government center, this can pose barriers for teachers in remote areas who can not easily travel long distances. For this reason, a mobile team approach was developed so that the training program could take place in remote areas. Trainers are dispatched, with training materials, to remote areas to provide the 2.5 month-training under the supervision of the District Education Office (DEO).

¹ In addition to this study findings brief, a full country report is available. RTI International. 2007. *Old Technology or New? A Study of Video Recording as an Innovative Method for Primary School Teacher Training*. Nepal Country Report. ADB TA6278-REG. Research Triangle Park.

² With co-financing from DANIDA.

8. A typical mobile team consists of about 6 'roster trainers' from the region who come to a training center designated by the DEO. Subject matter trainers rotate into the training program on a weekly basis, and then return to their regular teaching positions or school supervision. The 2.5 month training is divided into 31 days of training with the trainers, followed by 28 days of teaching practice in schools nearby, with supervision from the trainers and DEO staff. After the school-based training, they return to the training center for 9 days to share experiences and case studies that they have developed as part of the process.

II. STUDY PROCESS AND INPUTS

9. Given the above context, the study in Nepal focused on these mobile teams by providing them with a laptop and digital video recorder, similar to the package that each ETC media lab had already received from ADB. Targeting the mobile teams for the study served several purposes:

- To determine the added value that video recording has on teacher training, in order to provide recommendations for optimizing the use of the existing equipment provided by ADB.
- To have a clear control group (a training that did not involve technology) that could be compared with the study group (a training that involved the use of technology) to determine the impact of the technology on training.
- To know more about the added value of technology in rural areas.

10. Three mobile teams were selected and representatives were provided training on basic operation of equipment and how it could be used for pedagogical purposes. In addition to learning basic operating procedures for the equipment (e.g., on, off, saving data, recording, transferring video, etc.), the participants were able to view and edit some teacher training videos previously produced by NCED. This was the first time these trainers viewed video from NCED, even though it had been created for teacher professional development purposes, therefore the technology had an immediate outcome by allowing trainers access to this video.

11. From April 15 to June 30, the three mobile teams carried out their training remote training centers in Rolpa, Dolpa and Taplejung (see map, Annex I). These sites were chosen because they fall under three different ETCs: Surkhet, Rupendehi and Sunsari, and because they had training sessions planned during the study period.

12. The research questions for the study were designed to provide insight on the use of ICT in teacher education in a general manner—insights which could be applicable to other DMCs, as well as contribute to TEP project performance and specific objectives. The following research questions were used:

- i. How do ETC media labs improve teacher training?
- ii. How does ICT improve the effectiveness of mobile training teams to deliver quality teacher training in remote areas?

13. The methodology involved comparing post-training satisfaction questionnaires of the three training groups who were given the technology, against the same post-training questionnaires

from three control groups who did not use technology³. Additional technology-related questions were also added to the post-training questionnaire for the study group who used technology. A total of 77 questionnaires from control groups (31 Taplejung, 14 Rolpa, and 32 Dolpa) and 104 questionnaires from the study groups (56 Rolpa, 22 Taplejung, and 26 Dolpa) were filled out, collected and analyzed after each group's training period had ended. Two mobile trainers each from Rolpa and Dolpa, and one trainer from Taplejung also participated in in-depth interviews with the study team to provide details of how the equipment was used, and what effect it had on the teaching and learning processes. Finally, several ETC directors were interviewed in order to find out how they were currently using the ADB-funded equipment in the training centers.

III. STUDY FINDINGS

14. **Uses of the technology.** The study found that video recorders were used to record and playback (using the laptop) the following types of activities.

1. *Actual classroom lectures and activities.* This seemed to be the most common use of the video recorders. According to the trainers, this activity served the following purposes and intentions:
 - Trainers could improve their training practice by reviewing the video and self-assessing performance; they would also be able to review the video before the next time they teach the lesson (maybe after several months) to remind themselves what worked and what did not.
 - Trainers would be able to review trainee participation over the course of the 2.5 month period, which helped them to give final marks.
 - Trainees could retain the subject-matter content better, and could review lessons where they had specific questions by replaying the video later. Similarly, trainees who were absent could review the actual lesson on the video.
 - Trainees were more attentive and participated more, knowing that the lesson was being filmed.
 - DEOs and other training supervisors could verify the quality of training and provide feedback to trainers, or adjust the curriculum as necessary.
 - Trainees could take a CD copy of these activities, which could help to remind them of some certain processes, especially games and developing teaching aids.
 - One team also recorded group work and feedback sessions, which allowed the trainees in other groups to see what their fellow peers were discussing.
2. *Extracurricular activities,* including school opening and closing ceremonies and local cultural events.
 - Trainers could use these videos later to support social studies lessons.

³ The control groups were cohorts of face-to-face trainees from Taplejung and Rolpa, who completed the third phase curriculum during the period January to March 2007. The Dolpa mobile team did not operate during that period because of severe winter weather and snowfall that makes travel impossible in that region during that time. However, they did manage to contact trainees who completed the same third phase training in 2006.

- Video recordings could be shared among different training institutions, to show differences between urban and rural settings, or different cultures and regions.

3. *Microteaching* and student teaching (school-based, with children).

- Trainees were able to see their performance, self-assess their weaknesses, and make corrections.
- Trainees could also compare their performance during microteaching with performance in the actual classroom.
- School supervisors' comments on practice teaching to trainees in school, with help of video recording, was more effectively and positively received by trainees than without the recording.

15. Many trainees requested copies of all types of videos on CD to review them again after the training period. The mobile teams explained that although most schools and homes do not have computers, it is usually possible to find a computer somewhere in the village or neighboring village, including district education offices, so it is possible that they will be able to view videos later.

16. Laptops were mainly used for processing the video from the cameras to edit it to a reasonable amount of time, organize important clips, and playback video to the classroom. (No other projection equipment was provided). The laptops had CD drives, allowing them to playback pre-recorded model teaching videos provided by NCED. This was the first time any of the trainers had ever seen these videos, much less use any kind of video as a teaching aid. The trainers also used the laptops for administrative purposes, where they had the skills to do so. One trainer started a spreadsheet with student information; another team used the word processor to write letters and reprint a training manual for civic education.

17. **Added value.** Analysis of questionnaires shows that the perceived usefulness of the technology decreased where it was used the least frequently (Taplejung). It was also highest in the site where the trainers were most comfortable with the equipment (Dolpa). In Rolpa, the perceived usefulness of watching video was rated as very useful by a slightly larger percentage of trainees, and this may be related to the fact that teachers were able to watch the video individually, after school hours, rather than as a group (on a small screen).

18. A comparison of training satisfaction between the implementation group and the control group indicates that overall training satisfaction (as perceived by the trainees, when asked: "How much did you enjoy this training?") increased most in the Rolpa team. On the other hand, the Rolpa team was the only site where anyone in the implementation group answered "Very Little", and where anyone in the control or implementation groups answered "none". These results may simply be due to the fact that the Rolpa cohort was almost twice as large as the others (with a total of 57 trainees), therefore there is more chance for variation in the responses, as well as more reasons for dissatisfaction on the part of the trainees regardless of the use of technology. When the three sites are combined, there is only a very small increase in overall training satisfaction for the study group, to be explained by the variation from the Rolpa team.

Summary of technology use in mobile teacher training

Summary uses of video recorders

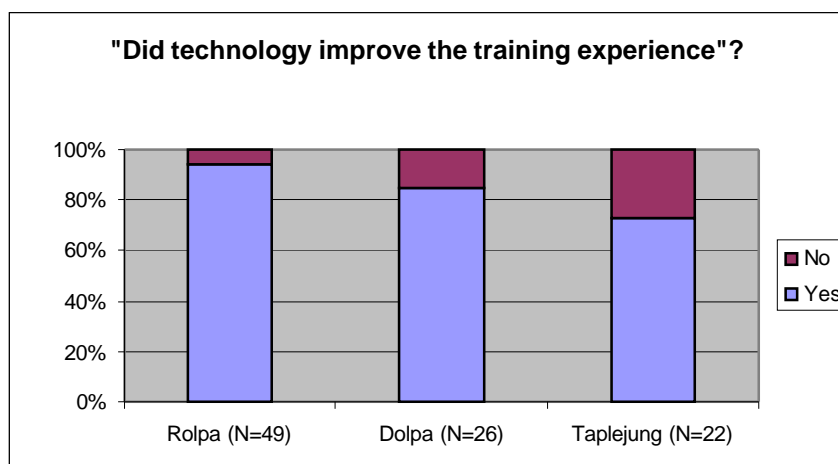
- To record training activities and classroom lectures
- To record extra-curricular activities, cultural, and community events
- To record microteaching practice

Summary uses of laptops

- To edit and playback videos
- For administrative purposes (creating teacher lists and writing letters)

(95% of study trainees rated their enjoyment as 'some' or 'a lot', compared to 90% for the control group).

19. In self-reported learning gains ("How much new knowledge did you learn during this program") there are quite important differences between the control and implementation groups, with the implementation groups expressing much more often that they learned 'A lot'. On the other hand, in Taplejung, the control group more frequently chose 'A lot' of learning gained. While there are many things that could have positively or negatively influenced learning outcomes between the two cohorts, it is interesting to note that again, where the technology was used the least frequently (Taplejung), the perceived knowledge gain was much less. Triangulating this self-reported data with official exam scores will be important for further analysis, but these results were not available in time for the study analysis.



20. However, when trainees from the study group were asked only about whether they believe that the use of these technologies improved the learning experience, they overwhelmingly answered "yes" (see chart, above). The qualitative feedback received from trainees and trainers through interviews and questionnaires is important to consider to build a case study of the potential for use of video in the classroom. To complement the absolute "Yes" and "No" responses discussed above, participants were queried about the specific advantages and disadvantages of using this technology in the classroom. A summary of their answers is provided in the following table.

Trainee views on positive and negative aspects of technology in the classroom

Positive Aspects of Technology	Negative Aspects of Technology
<ul style="list-style-type: none"> • Makes training interesting, exciting, unique, fun, creates learning environment • We could know about our performance, get feedback, identify our weaknesses • Permanency; having a record for a long time of our performance and activities • Learning is more effective, practical, real, and meaningful • Visual/sound is more effective way of learning • It is helpful for trainers to conduct training (organization, workload, and more active) • Various topics (including subject topics) related to training were shown • Can view colleagues activities, share best practices, get to know other places • Trainees were encouraged for participation, discipline, support and cooperate to learn • Could learn about technology • Arouses competition among participants • Can analyze overall training • As a tool for entertainment • Can show to students and parents 	<ul style="list-style-type: none"> • Classroom congested, dark, visual not clear • Lack of electricity, limited battery power • Lack of adequate resources (other resources) • Technical difficulties • Not used enough • Not enough video cameras • Time constraint so could not see all of our recorded activities • Use less creativity, less thought with video involved • Trainers were nervous, needed more training • Trainee did not get to use the video recorder • Expensive • Screen not big enough to see as a group • Too much attention on technology part • Not proper planning • Not used appropriately • Everyone could see other people's weaknesses⁴

21. **Constraints.** The trainers were only given two days of formal training in using the computers and video camera, which was not sufficient. Due to the fact that the computer operating system is in English, it was understandably much more difficult for trainers to learn to use the computer through trial and error. This is compounded by the fact that they were very nervous about being held responsible for any damage to the equipment; anything that they were not specifically trained to do they were unlikely to discover on their own. Recharging the equipment was also challenging, since trainers did not always have access to electricity. Additionally, some features that were missing from the equipment package include the following:

⁴ Only one person mentioned this as a concern, but it is an important risk to consider when assessing whether the context is appropriate for and how to manage the use of video in teacher training.

- Antivirus software for the computers. This will be important in the long term, if ETCs begin sharing equipment among themselves; however, it is a recurring cost, and most packages require a connection to the Internet in order to update the software regularly, both of which pose difficulties in the particular context.
- A tripod for filming. This would have been a minor additional expense, but would have made it much easier for trainers to film themselves teaching, or film trainees without being preoccupied by the act of filming. It would also mean that there would not necessarily be a need for a separate camera operator every time, and it would also improve the quality of the videos.
- Projector and/or external speaker for viewing videos on the computer as a group. The projector is an important piece of equipment for effectively using the video playback feature as a learning activity. However, it is not very feasible in a context where there is no reliable electricity source, and where transportation constraints would make it very difficult to transport such a fragile piece of equipment. A set of external speakers (if they run on battery power as well as AC/DC supply) would be feasible to add to the package, although the impact would be less important. Cords were provided with the cameras to allow projection through a television, but none of these teams had a television available.

22. **Use of equipment in the ETCs.** According to data collected during interviews with ETC directors and one ETC log sheet, the laptops and overhead projectors are being used often for lectures, although the specific use was not recorded (i.e., showing presentation slides, photos, etc.). However, the video cameras, if used at all, are mainly used to create videos of the training center and exhibition of educational materials created by the teachers. Some trainers and trainees benefit from reviewing educational materials created in past years, and the videos are used as a public relations tool to attract participants to the training program. The video recorders are only rarely used for recording microteaching or student teaching with the intent of playing back and self-assessing, but this experience has made them interested in trying to use model classroom videos more often. The computers and digital camera are used more often, but still mainly for administrative purposes and not pedagogical purposes. In one ETC, they stopped making videos for lack of human resources and anyone properly trained in using the equipment. To be able to continue, they will need full time computer operators who can tape the instructor delivering lessons or microteaching practice to distribute.

IV. CONCLUSIONS AND RECOMMENDATIONS

23. Drawing conclusions about the added value of technology in teacher training must keep in mind that the sample sizes in this study are relatively small, and there were some limitations to the study implementation and instruments⁵. However, it should also be acknowledged that there were few incentives for this extra effort by the trainers, and very little ongoing support to the them trainers for using the technology. Therefore, the fact that they did not abandon the study or the use of the equipment despite an unclear idea of how it should be used (both technically and pedagogically), as well as recurrent difficulties with charging and transporting equipment, is evidence that they believe that the technology can add value to the teaching process. It will certainly take more time for the trainers to become comfortable with the equipment, to discover the different pedagogical purposes that it can serve, and to determine the most appropriate strategy for managing the technology integration. Also any research in

⁵ Refer to the full country report, see footnote 1.

education must bear in mind that there are many factors that can influence learning, and isolating these factors can be as difficult as proving that meaningful learning has occurred at all.

24. Regardless of the limitations, the study does show that the technology has generated a great deal of enthusiasm on the part of both trainers and trainees, and may have additional added value in many ways besides increased learning on the part of the trainees. To summarize, the study found that the use of video recording:

- Improves the reputation of the training, as it is a symbol of a more modern approach.
- Improved practice on the part of the trainers as a result of being recorded, and viewing their performance on the video.
- Improves participation (of trainees and trainers), since they know that their performance may be reviewed again by a superior.
- Improves the learning experience by making it more interesting and fun.

25. There are many ways in which technology proved to be exciting and fun for the participants, but the purpose of the study was to understand its impact on learning. This is very difficult to measure quantitatively, but some of the ways that video technology can improve teaching effectiveness, as perceived by participants in this study, are as follows:

- Trainees prefer learning through visual methods.
- Improves content retention by being able to re-watch lessons more than once.
- Improves content understanding by being more attentive to the lesson when it is being filmed.
- Improves teaching practice by being able to review and self-identify weaknesses.
- Increases self-confidence as a result of being able to watch oneself performing in front of the class.

26. **Implementation issues.** Using video effectively in the classroom requires changes in teaching schedules, classroom management, lesson plans, and possibly even overall curriculum. These changes will have to be determined at the level of the institution and the classroom, depending on capacity and goals of technology use. This study shows at least three models, with advantages and disadvantages to each.

- Reviewing video immediately after recording. No trainers in this study actually used this method, but it remains a possibility to consider, especially when the goal is to record microteaching practice. This allows teachers to immediately see their performance and check it against pre-established criteria. However, it is also the most time consuming, and may not be feasible in large classrooms with limited equipment, and no projector.
- Reviewing video at a set time every day (after regular teaching hours or during a free period). This was the method employed in Rolpa, though it was a voluntary activity for the trainees. The advantage to using this method is that if individuals come alone or as small groups, the viewing experience is more manageable, and they can tailor

the review to their own needs (e.g., reviewing the clip that they need, rewinding as needed, etc.)

- Reviewing video at the end of the week. This is the method that was applied in Dolpa. There were not significant differences in training satisfaction between these two teams; thus, the option of reviewing video at the end of the week with the whole class appears to be effective. The advantage may be that the whole class can review certain lessons, and therefore benefit from improved content retention through repetition. Allowing several days to pass might indeed be beneficial in order to allow trainees time to reflect on aspects of the lesson that need more explanation.

27. The data from the Rolpa team experience suggest that effective use of the technology is enhanced greatly if there is one staff member who works nearly full time on technical aspects of the video use, such as recording, editing, preparing for playback, archiving and distributing as necessary.

28. **Training.** The mobile trainers need sufficient training on the use of the equipment, including the following:

- Organizing video clips in folders and/or a database (list) to make it easier to find them later. Most files were saved only on the desktop or in a root directory of one of the drives, and the file names were not specific, making it difficult even for the person who created the clips to find them later, much less someone else, like a supervisor, to eventually find and use an interesting video clip.
- Advanced features for operating the computer and camera. For example, one team could not save any clips to the computer because a small button had been pushed on the camera which locked it from this purpose. They also never used the cameras for taking still photos.

29. With regard to the TEP project and its objectives, this experience does provide some compelling reasons why video and portable computer technologies can, with appropriate planning, resources, and distribution, be used to address existing constraints *at the school level*, notably:

- **Lack of material resources.** The in-service training curriculum spends a great deal of time preparing teachers to create teaching materials using locally available, low-cost resources. This was usually the first thing that trainees noted in the post-training evaluation form, when asked to list the top three things they learned. Therefore, on a nationwide scale there are many examples of these types of teaching materials that can be used in the classroom. Video technology could help expand access to those examples by providing step-by-step examples of how to prepare certain materials (e.g., an origami figure) that may be difficult for teachers to recall later. It could also help provide examples to teachers who have not yet completed the training, and resources from different regions may provoke creativity and new ideas when shared with teachers in other areas.
- **School supervision and teacher performance evaluation.** An unanticipated outcome of this study is that the video cameras were used, without any prior instructions or encouragement for this purpose, for improving the performance of trainers and overall supervision of training implementation. If this purpose could be served in the teacher training institute, then there is every reason to believe that the same purpose could be served at the school level. Interviews during the initial site visit indicated from several sources that, on one hand, there is no systematic performance

appraisal of teachers, and promotions are based solely on seniority. Therefore, there is little incentive for improving teaching practice. The use of video could be instrumental in changing this, as video could easily be used for developing electronic teaching portfolios and centralized or decentralized performance assessment (i.e., at the school level, or sending copies of videos to ETCs to be reviewed.). Other constraints noted with regards to teacher performance evaluation are that school supervisors might not be knowledgeable in specific subject areas and thus incapable of judging the quality of these lesson; similarly, older teachers often do not like to be evaluated by younger teachers. Video could have an impact on these constraints if teachers could be recorded and have their performance assessed 'remotely' by a subject matter expert that is unknown to the teacher.

- **Limited community-school relations.** During the study implementation period, trainers used the video cameras for recording many different types of classroom activities, including games, group work, student presentations, and teaching materials prepared by the teachers. Similar exercises at the school level, followed by presentation to the community and parents, could help to improve school-community relations by showing parents the role of teachers, and the difference that participatory, creative and joyful learning environments can make to the classroom experience. In turn, perhaps parents would begin to demand better performance on the part of teachers, and begin to invest more (personally and financially) in school operation.

30. There are also lessons learned that can be applicable on a wider scale, namely, that teachers—both school teachers in training or teacher trainers—value the opportunity to see themselves practicing in front of the classroom, and being able to correct their weaknesses and gain confidence. The compact and portable nature of today's video cameras make this much more feasible than VHS tapes played back on a television (the way that video has traditionally been used in teacher training in other countries) for remote and resource-poor settings. Furthermore, digital video provides more convenient options for sharing and storing videos. Sharing digital clips can be an effective way to enhance teacher training programs by allowing trainees to see current practices in other schools, and share cultural and methodological videos. Again, this is particularly beneficial to remote schools who might not otherwise have this opportunity.

31. There are potentially many ways that digital video recording and distribution could be used as a tool to improve teacher training. A particularly interesting option to explore in future research—both in Nepal and elsewhere—would be the extent to which it can be used to support performance evaluation of teachers and teacher trainers.

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