Turning On A Dime: The New Landscape Of Adult Learning

A Technical Paper prepared for SCTE by

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1. Abstract

This quantitative study considers the perceived effectiveness of virtual training events from the learner perspective. Data considered as part of the study include post-training participant evaluations gathered through the learning management system (LMS) of a large telecommunications operator, for both pre- and post-pandemic courses. Courses provided by eleven trainers from one geographic region were included as part of the study, and responses to evaluations were analyzed to identify whether a relationship exists between the trainers who received developmental training on adult learning theories and practices in the virtual classroom and participant perceptions of effectiveness. The findings indicate that participants have a more favorable perception of some elements of virtual training classes, when provided by instructors who have received additional training, and that instructors who have not received training receive lower scores in some categories. These findings indicate that adult learning theories and practices, if applied properly in the virtual classroom, create a learning experience that is just as effective as the traditional in-person classroom.

2. Introduction

Prior to the start of COVID-19 pandemic, the prevailing belief of many educators and business leaders was that in-person instructor-led training was far superior to virtual or online learning. Online learning experiences were considered a substandard or fallback option for workplace learning, and in many K-12 and post-secondary settings were often not considered at all. A report from the US Department of Education (2020) found that in the 2018 school year, 64.7 percent of post-secondary students were not attending any distance education or online courses, and only 16.6 percent were exclusively attending distance education courses. This paradigm shifted almost overnight, when the need for social distancing forced widespread migration to virtualized teaching and instruction for all learners, from K-12 and post-secondary to adult learning experiences in the workplace.

As a result of the shift, learning organizations have been challenged to re-evaluate how we transfer knowledge and specialized skills. Technologies such as Zoom, Microsoft Teams, and Cisco WebEx have replaced the traditional classroom environment in all levels of education. After a full year of distance learning, opinions vary widely on whether remote learning meets the needs of learners, or whether this learning modality should remain relegated to the role of a backup or emergency solution.

Modern theories of adult learning, known as andragogy, provide important insights into this question. Research indicates that effective and positive learning experiences can still occur in a virtualized delivery model. A 2010 meta-analysis of thousands of empirical studies by the US Department of Education found that students in online learning experiences performed slightly better than those in instructor-led events. Further inquiry is needed to gain additional insights specifically related to the pandemic and the experience of adult learners in the workplace, and could help expand the collective understanding of this important and timely topic.

3. Literature Review

The need for alignment to core andragogical theories in the online classroom is not a new concept. Malcolm Knowles, widely considered the founder of modern theories of adult learning, predicted in 1983 that the significant increase in electronic delivery of training would require adult learning professionals to learn how to "use the technology in congruence with principles of adult learning" (Blackwood & White, 1991).

3.1. Adult Learning Theories

The topic of how adults experience learning and transfer knowledge is a well-researched and robust area of study.   Early works by Knowles (1975; 1980) outline the foundational principles that most subsequent studies have sought to prove or refine. The common characteristics of adult learners as understood within the profession (Merriam & Bierema, 2014; Abdullah, et al, 2008) are as follows:

- Self-Direction: Adult learners must be actively involved in the process of learning and have agency over the direction of the course, and in some cases, the selection of content.
- Experience: Adult learners bring their own life experience and knowledge to the learning environment, and effective facilitators of adult learning must recognize this and seek to connect the learners' experience to the topic being taught.
- Goal-Orientation: Adult learners have a goal in mind when attending learning experiences, whether that is to broaden their knowledge for a job or profession, or simply for personal development.
- Relevancy-Orientation: Adult learners must recognize the value or reason for the topic being taught, and tend to be more problem centered.

These principles have been further studied, refined and expanded upon since their introduction, but are commonly considered the core of adult learning practices, and apply in learning environments ranging from formal learning experiences such as post-secondary education to informal experiences found in social or community programs. Research on the use of these theories in the workplace learning environment is a fast-growing area of study (Caruso, 2018; Hendriks et al., 2018; Cookson, 2001; Grow, 1991), and the inquiries found in this study offer a meaningful addition to the literature.

3.2. Conversion to the Online Classroom

While the need for social distancing during the height of the pandemic required an immediate change to delivery methods, in many cases the content and learning outcomes were not in alignment with the modality. Davis and Arend (2013) clearly outline the different ways of learning and how a careful alignment between instructional methods and desired learning outcomes is critical to the success of any learning experience. Specifically in the context of online learning, Fein and Logan indicate that instructors must not directly transfer content originally designed for the in-person classroom without making the adjustments to the activities and program to better align with the learners' needs (2003). Further findings from Fein and Logan (2003) indicate that students rated courses more highly where the instructor made appropriate changes to adapt the course to the online environment.

Independent of the content itself, changes are required for the instructor in terms of methods and practices used for delivery. One of the notable challenges related conversion to online instruction is the complexity of the computer based classroom when compared to the traditional classroom. Instructors need to facilitate an environment where learners experience self-direction and construct meaning during the learning process, and must work to create meaningful discussion through improved listening skills and asking more facilitative questions to create dialogue (Davis & Arend, 2013; Fein & Logan, 2003). Realism of the learning environment is also key to success and learners benefit from the content being more project- and activity-based (Fein & Logan, 2003)

3.3. Andragogical Principles in Online Classrooms

Adult learning theory's application in virtual classroom environments is vast in scholarly literature. Arghode et al. (2017) and Deineha et al. (2020) have conducted systematic reviews on andragogical

learning principles that examine student's perceptions of excellent online instructional delivery. Findings suggest that instructor involvement is equally important and relevant when aligned with deep content (Arghode et al., 2017). Further evidence supports the theory that an online instructor can operate as a facilitator within the online student population by running activities and providing immediate feedback; this gives the students feel of control over their understanding and improved guidance throughout the course (Arghode et al., cites Yamagata-Lynch et al., 2015). Adult learning principles, when applied correctly, aid knowledge transfer by satisfying basic student needs. On the other hand, Arghode et al. (2017) and Deineha et al. (2020) also noted conflicts between students' perceptions when andragogical principles are applied for online classrooms in the same way they would be applied for in-person classes; resulting in negative student perceptions. Furthermore, the collaboration between teacher-to-student or student-to-student showed not to be perceived as necessary, stating that students were likely to favor individual work in an online setting (Arghode et al., 2017; Deineha et al., 2020). The literature analysis on adult learning theory in virtual classroom delivery shows a theme that adult learning practices for online environments require specific curating, similar to in-person adult learning. Likewise, a perceived gap suggests that little study has been done specifically for adult learners in a technical field under a large telecommunications operator.

The purpose of this quantitative study is to investigate the inclusion of foundational adult learning theories and practices in the virtual classroom for technicians of a large telecommunications operator, and analyze whether use of these methods in remote learning experience proves just as effective as in-person learning. To do so, we pose the following questions:

- Does the perceived effectiveness of virtual training change based on the use of adult learning principles/methods by the trainer?
- Do trainers who have received additional training themselves on adult learning in the virtual space receive better scores from participant on level 1 evaluations?

4. Research Methods

As detailed in the literature review, sources exist relative to the topics of adult learning theories and practices and the synchronous online environment, but limited research exists that specifically links the training of instructors back to the evaluation scores of learners. To that end, a quantitative method was selected for this study, in order to consider the existing data set related to learner reactions that is already captured in the Learning Management System (LMS).

4.1. Participants

The population considered in the study is comprised of employees within the field operations business unit of a large telecommunications operator, with the representative sample drawn from employees who completed any courses, both ILT and VILT, between July 1st 2019 and July 1st 2021.

The nonprobability sampling method was used to select one geographic region to consider as part of this study. This method was selected largely due to availability of data and because the particular region represents the phenomenon being studied (Creswell, 2003; Creswell & Guetterman, 2019). The region selected has a staff of eleven technical and safety instructors, some of whom received additional training and coaching on core adult learning theory and instructional methods in the virtual classroom, and others who did not.

4.2. Data Collection

The concept of levels of evaluation for learning experiences was first outlined by Kirkpatrick (1959, 1976, 1996) and is still a common method used to quantify impact of training. Kirkpatrick's model is comprised of four levels, typically explained as reaction (level 1), learning (level 2), behavior (level 3), and results (level 4). For purposes of this research, we are considering the level 1 evaluations for the selected group of learners. After completion of training courses, data were collected using a survey link sent via email to participants. Participants are not required to complete level 1 evaluations, and do not receive any follow up reminders if the evaluation is not completed. While the learner identities are captured automatically within the LMS, that information was removed from the data set for purposes of this study to maintain full anonymity of learners.

The evaluations contain a combination of question types, including traditional and modified Likert scale, Yes/No, multiple choice, and open-ended responses. For purposes of this study, the open-ended responses are not considered, due to the notable challenge with qualitative methodology and large numbers of responses which require significant time for accurate and meaningful coding and analysis to identify themes (Creswell, 2003; Creswell & Guetterman, 2019).

Question across the three evaluations ranged from the topic of pace ("The pace of the learning was…" with learners given modified Likert scale options) to topics of applicability ("Select the statement that best reflects your ability to apply the information"). In addition, one evaluation included questions that were specific to the performance of the instructor ("Did the facilitator of the course…Create an environment where I could ask questions and provide input?") answered using a traditional Likert scale.

4.3. Data Analysis

The data were exported into a spreadsheet from the Cornerstone™ LMS. Information that could be used to identify individual respondents (e.g. employee number) was removed from the data set. The trainers were each assigned a number (e.g. Trainer 1) which was used throughout the rest of the analysis. As noted above, the open-ended text responses are not considered within the scope of this study, and were removed from the data set. All Likert scale responses were coded using numeric values (e.g. 5 - Strongly agree, 4 – Agree, 3 - Neither agree nor disagree, 2 – Disagree, 1 - Strongly disagree) and Yes/No responses were coded as Yes=2 and No=1. A modified Likert scale was used for multiple choice questions with four possible answers, where 4 represents the positive response and 1 represents the negative response.

The database also required cleanup activities to remove responses not relevant to this study, such as questions asking for the name of the instructor. In addition, all non-answers/non-responses were removed from the data set.

The data were organized into four discrete groups, representing the time frame of pre- and post-pandemic, and further into groups representing those trainers who received additional training themselves on incorporating adult learning theories and practices into the virtual classroom, and those who did not. The groups were labeled Group 1, Group 2, Group 3 and Group 4 to enable simple comparative analyses of the data. See Table 2 for detail on group designations.

Table 1 – Group Designations

Group	Description	Start Date	End Date
1	Pre-COVID ILT	July 1, 2019	March 1, 2020
2	VILT, Prior to additional training being offered	March 1, 2020	May 1, 2020
3	VILT, Trainers who received additional training	May 1, 2020	October 1, 2020
4	VILT, Trainers who did not receive additional training	May 1, 2020	October 1, 2020

Trainers from the selected sample were assigned to groups based on specific criteria. All trainers from the selected sample were assigned to both groups 1 and 2, since all trainers delivered ILT prior to the pandemic, and all trainers delivered VILT sessions without receiving additional training during the early months of the pandemic. The trainers were then assigned either to group 3 or 4, based on whether they received developmental training in the following months. See Table 3 for detail on group assignments.

Table 2 – Trainer Group Designations

Code	Group 1	Group 2	Group 3	Group 4
Trainer 1	x	x		x
Trainer 2	x	x	x	
Trainer 3	x	x		x
Trainer 4	x	x		x
Trainer 5	x	x		x
Trainer 6	x	x	x	
Trainer 7	x	x		x
Trainer 8	x	x	x	
Trainer 9	x	x	x	
Trainer 10	x	x	x	
Trainer 11	x	x		x

After separating the data into four groups, the Likert scale questions were separated from the other types of scored questions, to enable numeric analysis using the same 1-5 scale for Likert, and the 1-4 and 1-2 scale for multiple choice and yes/no, respectively. Lastly, in the final data analysis all numeric values were converted to a percentage (e.g., for Likert scale the maximum number of points available is 5, so the final score for each category was divided into 5, while the multiple choice maximum score was 4, so the final score for those categories was divided into 4, and so on). This method enabled a more mathematically accurate comparison of participant response patterns.

As noted earlier, participation in level 1 evaluations after course completion is voluntary, so the results represent only those learners who chose to provide feedback. A total of 98 unique participants provided responses for courses attended during the considered time. Gathered responses were separated into the group categories identified in Table 2. In analysis of the four groups, no responses were received for any VILT courses provided during the identified time period for group 2. VILT courses were offered during this time period by the identified instructors, but no participants responded to level 1 evaluations for the VILT courses. As a result, group 2 data was not used as a comparative for the purpose of this study. Data were able to be considered related to group 1, identified as the pre-pandemic traditional ILT classroom. This dataset is used for the control in order to have a meaningful comparative for groups 3 and 4.

During the time period considered, data was collected using three different level 1 evaluations. To combine these data sets, all individual questions from the three level 1evaulations were reviewed and assigned to one of three possible categories, and one of ten possible subcategories. This categorization aligns with the foundational adult learning principles related to the questions, and enables us to consider the unique participant responses independently of the specific evaluation used, and thus identify trends in the responses. The three categories questions were mapped to are learner needs, learning technology, and adult learning theories and practices. Some subcategories may align with multiple higher-level categories, to enable deeper analysis of topics as aligned to adult learning theories. See Table 3 for detailed category and subcategory mapping.

Table 3 – Evaluation Questions and Categories

Categories	Subcategories
Adult Learning Theories & Practices	Instructor Overall Satisfaction
Adult Learning Theories & Practices	Classroom Management
Adult Learning Theories & Practices	Learning Objectives
Adult Learning Theories & Practices	Instructor Communication
Adult Learning Theories & Practices	Instructor Knowledge
Adult Learning Theories & Practices	Learning Pace
Learner Needs	Content Related to Job
Learner Needs	Learning Pace
Learner Needs	Overall Satisfaction/Recommendation
Learner Needs	Instructor Interaction
Learner Needs	Instructor Overall Satisfaction
Learner Needs	Learning Objectives
Learning Technology	Learning Technology

After mapping all questions to these ten subcategories, we identified significant challenges with categories of instructor interaction, instructor knowledge, instructor overall satisfaction, learning pace, and overall satisfaction/recommendation. Earlier level 1 evaluation models containing questions with these topics used a Likert scale, affording participants more range of possible answers; while the later version of the evaluations changed this concept to a yes/no question. The change in question and answer criteria caused significant variances between the two data sets, and we determined that the best and most accurate way to address this was to remove these categories from consideration within the scope of this research to avoid any potential inaccuracies in findings. Additionally, the subcategories of classroom management and instructor communication were not able to be mapped to the newer questions in the later level 1 studies, so these were also removed in order to avoid errors. The three remaining subcategories are considered within this study: content related to job, learning objectives, and learning technology.

5. Results

As noted in the literature review, adult learners tend to be practical and have a need for their learning experience to be relevant to their life or work (Merriam & Bierema, 2014). The subcategory of "content related to job" contains all questions from the three different level 1 evaluations that were determined to align with this concept. See Table 4 for all included questions for this subcategory. Participant mean

responses in group 1, the pre-pandemic traditional ILT group, were 86.53 percent positive, while group 3 and 4 responses were 89.29 percent positive and 87.50 percent positive respectively.

Table 4 – Content Relevance to Job Category

Question Text
I had sufficient opportunities during the training to apply and practice the concepts and skills presented.
This session has increased my ability to perform my current job.
Training activities reflected real world, on-the-job situations.
I plan to use this information in my current job.
The material covered is relevant to my job.
I would recommend this training program to a colleague in a similar position.
Select the statement that best describes examples and activities in the course.

The second subcategory analyzed was learning objectives, aligning with the adult learner's need for clarity on the goals and intended objectives of their learning experience (Merriam & Bierema, 2014). The questions included in this category address both the participant perception of their understanding of the objectives (e.g., "I had sufficient opportunities during the training to apply and practice the concepts and skills presented") and the participant perception of the facilitator's ability to clearly explain the objectives (e.g. "The facilitator clearly explained the program objectives"). See Table 5 for all included questions in this subcategory.

Table 5 – Learning Objectives Category

Question Text
The learning objectives were clear.
The facilitator clearly explained the program objectives.
I had sufficient opportunities during the training to apply and practice the concepts and skills presented.
Select the statement that best reflects your ability to apply information.
The facilitator clearly explained the program objectives.

For group 1, participant mean response was 87.20 percent positive, compared to 78.57 percent positive and 75.00 percent positive for groups 3 and 4 respectively.

The final subcategory of questions considered within the scope of the research was learning technology, which included questions designed to gather participant perceptions of whether the use of technology supported or detracted from their learning experience. See Table 6 for included questions in this subcategory.

Table 6 – Learning Technology Category

Question Text
Did the learning environment and/or technology support your learning?
Select the statement that best describes the use of technology in this course (if applicable).

The mean participant response for group 1 in the learning technology subcategory was 84.78 percent positive, compared to 82.14 percent and 98.75 percent for groups 3 and 4 respectively.

5.1. Discussion

While we anticipated that the mean evaluation scores for ILT (group 1) compared to VILT (groups 3 and 4) courses would show a higher positive response for ILT; that was only found to be the case for the subcategory of learning objectives, with the ILT group having a mean score of 87.20 percent compared to the much lower scores in groups 3 and 4 (78.57 and 75.00). This may indicate that instructors are more accustomed to clearly identifying the desired outcomes or objectives of the course in the traditional classroom compared to the VILT environment. Another interpretation could be that the participants scored this category higher for ILT because they were better able to understand and identify the objectives of the course, related to greater opportunities for hands-on practice of skills. Group 4, the trainers who received less developmental training on adult learning theories in the VILT environment, were lower than their peers who received the additional training, implying that they were less proficient at recognizing and including the importance of reinforcing learning objectives within this type of environment.

The category of content relevance to job was marginally higher for group 3, the group of trainers delivering VILT courses who received additional training on adult learning theories and practices. This finding implies that even in an online environment where learners are afforded limited opportunities for practice of the skills learned in the course, an instructor who uses techniques to engage the learners and construct meaning is able to foster an environment where learners are able to identify how they can use the information back on the job. An interesting pattern that also emerged in this category was that those trainers receiving this additional training scored higher in this category for VILT courses, even when compared to traditional ILT courses. Additional developmental training for instructors on adult learning theories and practices had an overall positive effect on learner perceptions, regardless of the type of classroom environment.

The final category, learning technology, provided surprising and important insight into learners' perceptions of the role of technology in the ILT environment compared to VILT. The ILT course perceptions related to technology use represent participant impressions do not relate to the use of an online/virtual teaching medium (e.g. Webex), but rather are connected to the use of technology labs or other materials found in the ILT setting. As such, this data point is less effective when used in comparison to the learner perceptions recorded for groups 3 and 4, in the exclusively VILT settings. What is unexpected about this data is the significantly higher (>10 percent) favorable scoring for group 4, the trainers who did not receive additional coaching on adult learning practices prior to delivering these courses. The trainers in group 3 who received additional developmental training on adult learning in the VILT environment also received coaching on use of tools within the online training platform, such as breakout rooms, polling, and other features. It is likely that these trainers subsequently utilized these tools during their sessions; and the participants' lower positive score may indicate that the use of these tools distracted them from the learning. The findings may also indicate that group 4 instructors relied more heavily on their instructional techniques rather than the online tools, again creating less distraction for the learner.
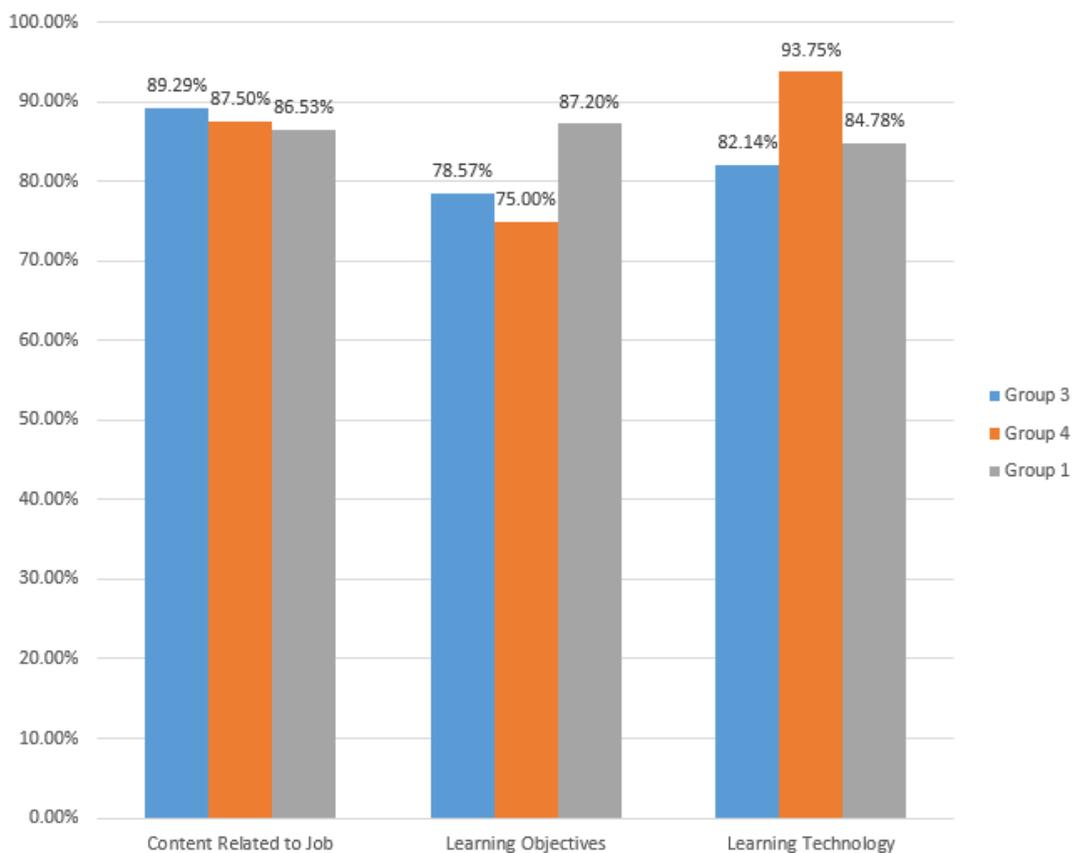
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Figure 1 – Category and Group Comparison

5.2. Study Limitations

While this study provides a fascinating starting point for inquiry into this topic, some limitations exist related to the data available. The first consideration is related to the sample, and whether it accurately represents the population considered. Specifically, since level 1 evaluations are not a requirement of learners but are considered optional, we are only gathering the opinions and perceptions of those learners who felt strongly enough to take the time to respond. As a result, the responses may be skewed either towards a more positive angle (learners who felt strongly that the course went well and wanted to provide this feedback) or a more negative angle (learners who had a poor experience and want to share this). Greater accuracy could be obtained by sampling a set of the larger population and requiring learners to respond within the sample, to ensure that positive, negative, and neutral responses are all gathered and considered.

Another limitation of the study is related to the technology and the function of the LMS used to gather the data. Learners are not issued the level 1 evaluation invitation until the trainer providing the training marks the course roster as complete. As a result, if there are any issues with the roster close-out process, the learner may not even be given an opportunity to respond.

We were also challenged by the change of the level 1 evaluation questions during the time period considered. While the overarching topics were generally similar, as evidenced by the ability to categorize the questions for scoring analysis, it is certainly a challenge to have the required level of clarity on the data when there are significant differences in the data set. Specifically, several of the categories changed

from a 5-point Likert scale to a 2-point yes/no scale between iterations of the report, which rendered meaningful analysis within these categories impossible. Future studies of this type would be enhanced through the use of a consistent set of questions and question categories for the entire time period considered; which was not a possibility for this particular inquiry.

Lastly, the subjective open-ended responses that participants provided were not analyzed in this study. To appropriately code qualitative data, researchers must perform extensive review and analysis to ensure accuracy and objectivity (Creswell, 2003). Future studies of this type would benefit from a mixed-methods approach in order to gather both the quantitative responses that can be more easily analyzed, alongside open-ended qualitative responses from learners. Greater triangulation by considering perspectives from different sources beyond just the learners (e.g. trainers, operational leaders) could also strengthen the data and findings.

6. Conclusion

The findings of this research show a pattern of positive learner perceptions of virtual courses after the trainer has received additional training on virtual facilitation techniques and adult learning theory. Concepts from the literature related to application of adult learning principles in general, and specific guidance for the online classroom were supported in the findings. Although future study is needed to further explore this topic, the present study has enhanced the understanding of the relationship between application of adult learning principles in the online learning space, and positive participant experiences.

Abbreviations

LMS	Learning management system
ILT	Instructor-led training, used to indicate in-person/classroom training
VILT	Virtual instructor-led training, indicates online training
K-12	Kindergarten through twelfth grade school setting

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