

**Teacher Training Workshop for integration of Coding in Elementary School
Curriculum**

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Table of Contents

<u>Brief Context</u>	3
<u>Needs Assessment</u>	3
<u>Brief Analysis of Survey Results</u>	4
<u>Teacher Workshop Framework</u>	13
<u>Goal</u>	14
<u>Learners' Analysis</u>	14
<u>Evaluation Plan</u>	15
<u>References</u>	16

Brief Context

Contextual analysis provides information about environmental factors that will affect the design and delivery of the instruction (Morrison et al, 2010). Coding, which teaches problem-solving and critical thinking skills, has become a crucial part of the American curricular system. Students experience diverse ways of learning and take any task as a challenge. It has been observed widely that coding promotes self directed learning as students take interest in learning via coding. Norman Public Schools have already been working on promoting coding via a number of devices. Both Middle and Secondary school levels are already incorporating different Makerspace technologies in their coding curriculum but this incorporation has not been standardized or consistent at the elementary level. The State of Oklahoma recently declared that all Oklahoma Public Schools must incorporate coding into their elementary curriculum.

Needs Assessment

Needs assessment is a tool designers use to identify performance problems in many different areas (Morrison et al, 2010). Keeping in view the above context and before implementing the decision of the State of Oklahoma, it was important to see which coding technologies the elementary schools had. Additionally, we needed to check the condition of the existing coding devices in the schools - whether they were workable, not workable, broken or slightly damaged. Last but not the least, it was extremely important to see how skilful elementary school teachers were in using coding devices to teach coding. Are they trained enough to use various devices for coding or there is a need for a training intervention.?

Dr. Lee Nelson, a Technology Integration and LMS specialist at Norman Public Schools is my supervisor. She and her team members designed a survey to collect data from different

teachers of elementary schools to assess the status of the coding devices and how skilful the teachers were in using those devices at elementary level. The survey was prepared through Google Forms. Names, email addresses, roles, e of persons completing the survey were required. The questions asked in this survey are listed below. Twenty-five people participated in this survey. It took almost two weeks to collect the responses. The responses of the participants are attached in this hyperlink.

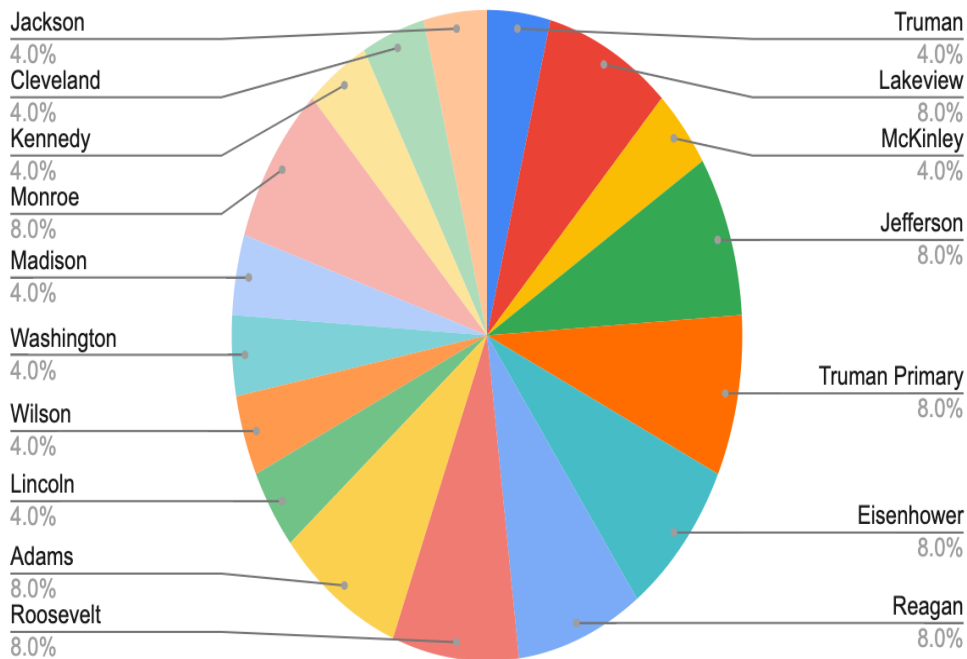
[Survey for Coding Devices](#)

Brief Analysis of Survey Results

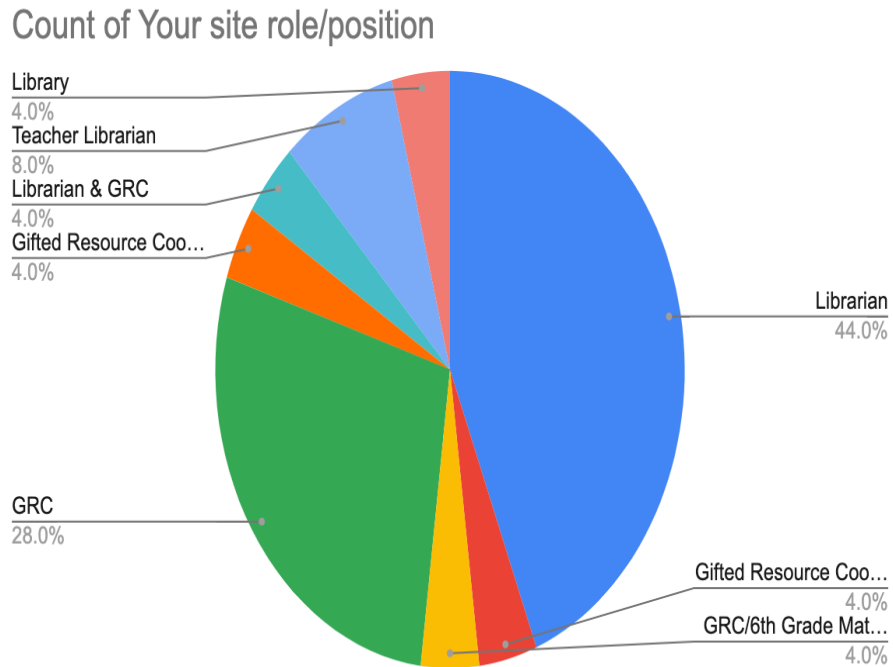
Q1. About the names of the participants (Data not included because of privacy issues)

Q2. Shows the School sites.

Count of School Site



Q3. Indicates the role or position of the participants.



Among the participants, there were 12 Librarians, 10 GRCs (Gifted Resource Coordinators), 1 was both the Librarian and GRC, 2 were Teacher Librarians.

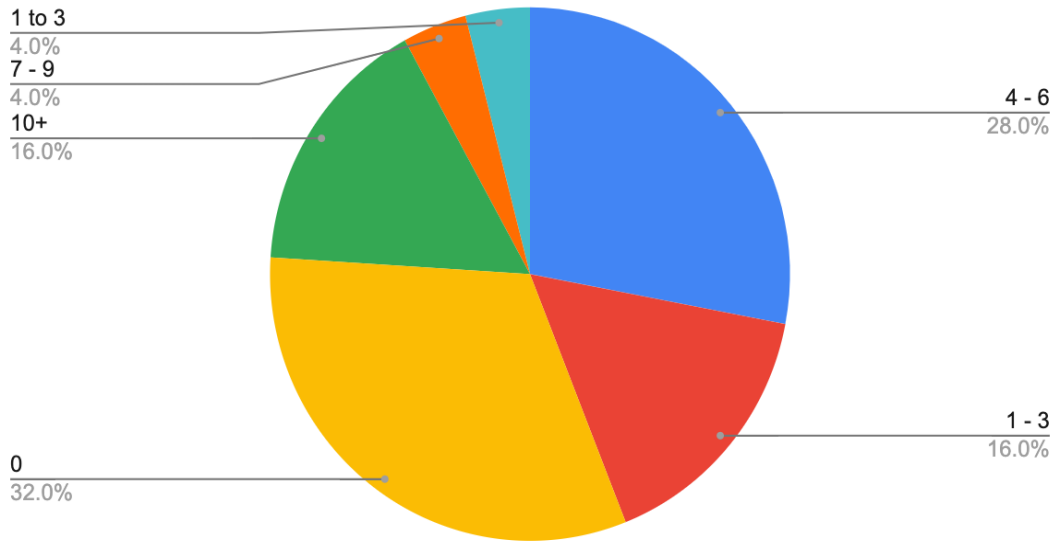
Q4. Do you have technologies that can be coded? Check all that apply

Little Bits, Ozobots, Spheros, Osmos, Wonder Workshop Dash, Lego Education, Brush Bots, SAM Labs, Bot Balls

Little Bots: Please refer to the embedded link for data about Little Bots. [Survey: Excel Sheet](#)

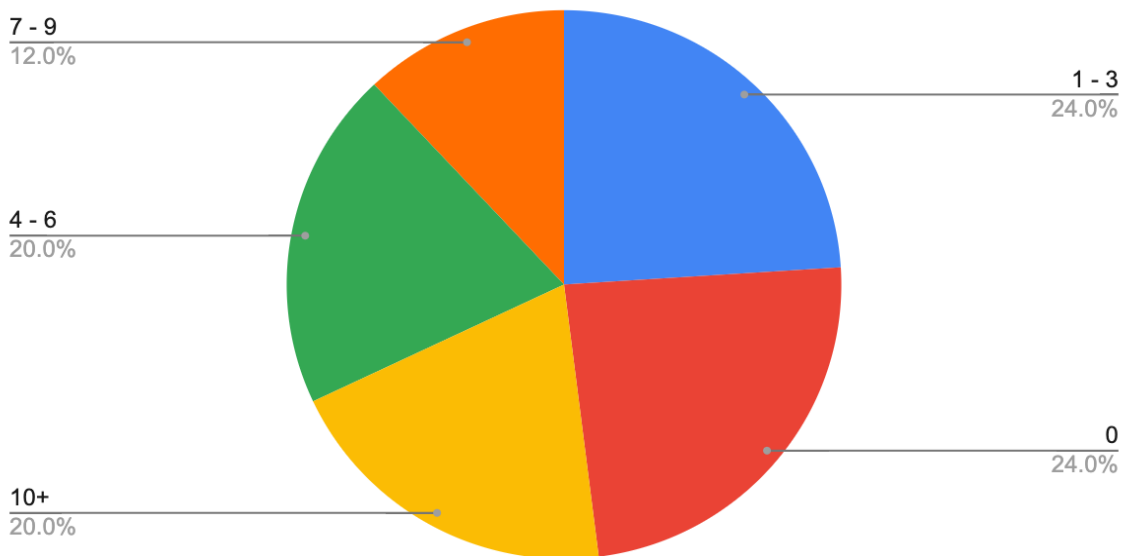
Ozobot

Count of Do you have technologies that can be coded? Check all that apply. [Ozobot]



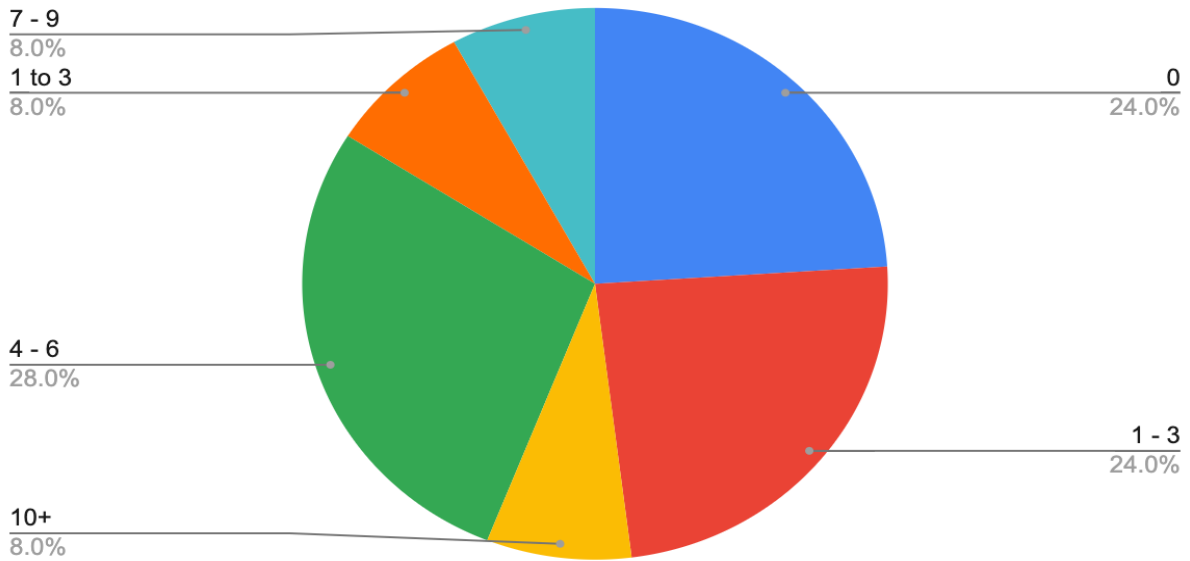
Sphero

Count of Do you have technologies that can be coded? Check all that apply. [Sphero]



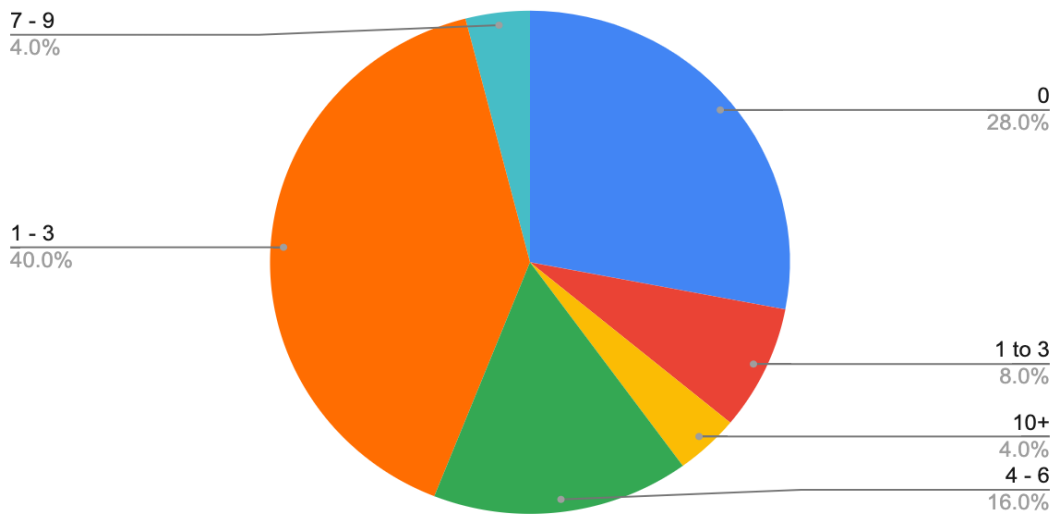
Osmo

Count of Do you have technologies that can be coded? Check all that apply. [Osmo]



Wonder Workshop Dash

Count of Do you have technologies that can be coded? Check all that apply. [Wonder Workshop Dash]



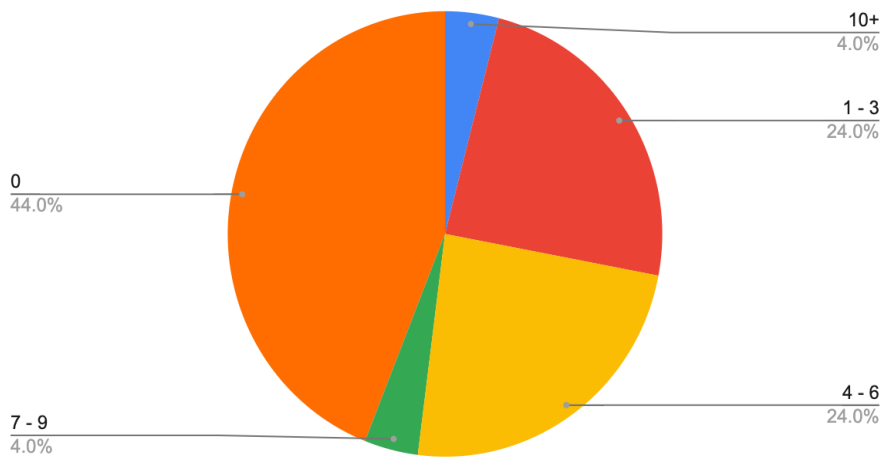
Lego Education: Please refer to the embedded link for data about Lego Education. [Survey:](#)
[Excel Sheet](#)

Brush Bot: Please refer to the embedded link for data about Brush Bots. [Survey:](#) [Excel Sheet](#)

SAM Labs: Please refer to the embedded link for data about SAM Labs. [Survey:](#) [Excel Sheet](#)

Bot Ball

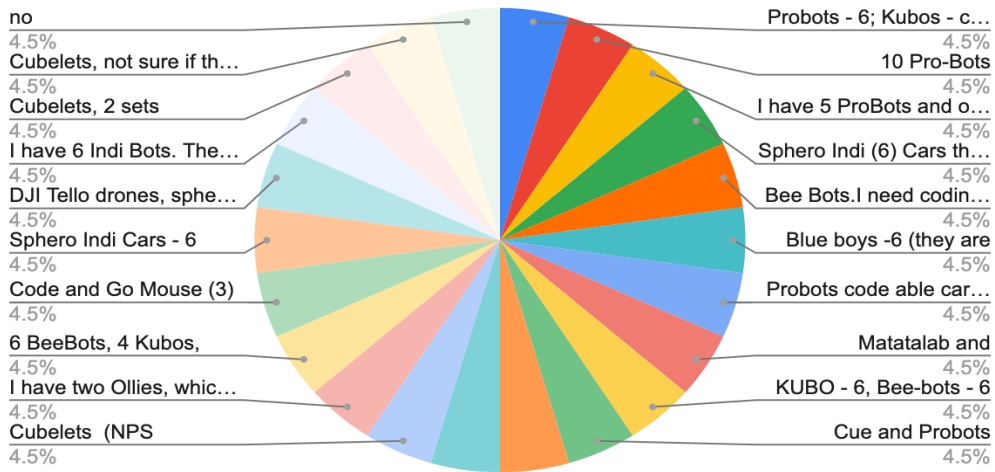
Count of Do you have technologies that can be coded? Check all that apply. [Bot Ball]



Most of the responses ranged between None and 1-3. 16 people chose 'None', 6 people checked the box for 1-3, 2 people selected the range between 4-6, and only one response indicated that they had 10+ of the above mentioned coding technologies. The responses to this question confirmed that a large number of schools possessed a few technologies that can be coded and some did not possess any of these technologies.

Q5. Do you have other coding technologies not listed above? Please describe what they are and how many you have.

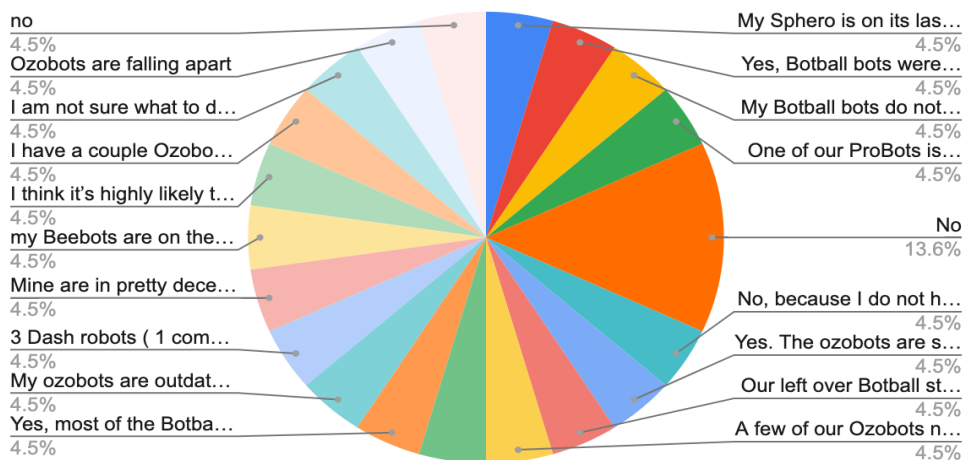
Count of Do you have other coding technologies not listed above? Please describe what they and how many you have.



Other than the technologies mentioned in the first question, most of the schools possessed Probots, Beebots, Sphero Indi, Cubelets and a number of other coding devices. One of the responses showed that they were waiting for some grants and were hoping to get new coding devices. Three people left the column blank which probably meant they did not have any other coding devices at all and one response was simply 'No'.

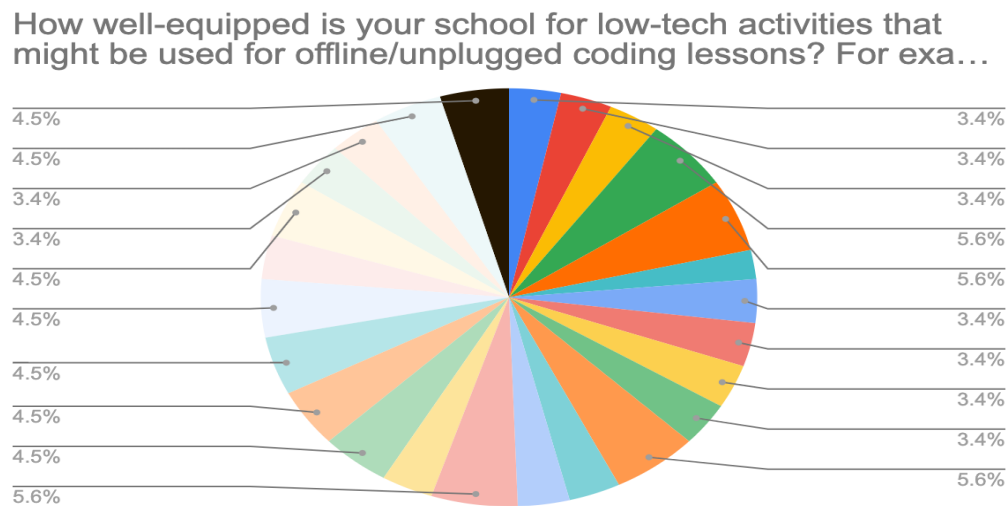
Q6. Are some of your coding technologies broken? Please describe.

Count of Are some of your coding technologies broken? Please describe.



Three people responded No', 3 left the space blank, 2 said that they did not have any coding devices, and the rest of the people described the problems with their coding devices. Some were broken, some did not have batteries, some were quite old and some were not functioning for unknown reasons.

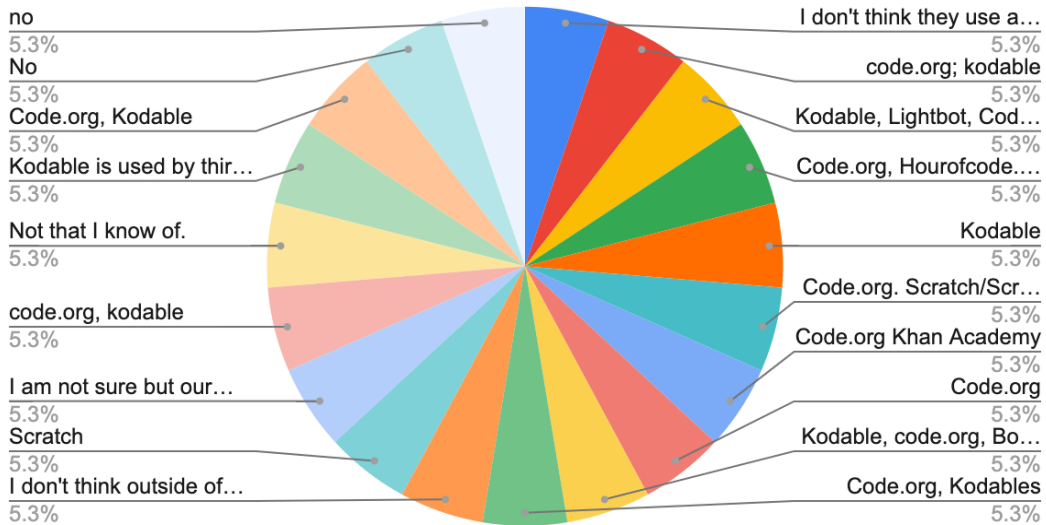
Q7. How well-equipped is your school for low-tech activities that might be used for offline/unplugged coding lessons? For example, do you have paper, card stock, glue, tape, yarn, paint, Legos, etc?



Options given were from 1 to 5. Rising numbers showed that the school had plenty of equipment for unplugged coding lessons. 13 people selected 3, 7 participants chose 4 as an option, 4 opted 5 which means that 4 of the schools had plenty of equipment for unplugged coding lessons, and 1 person selected 2 from the given options. This figure was not bad as almost all the schools could design lessons for unplugged coding lessons according to the availability of the equipment..

Q8. Do you know of any coding apps or websites that teachers use with students? If so, please list them.

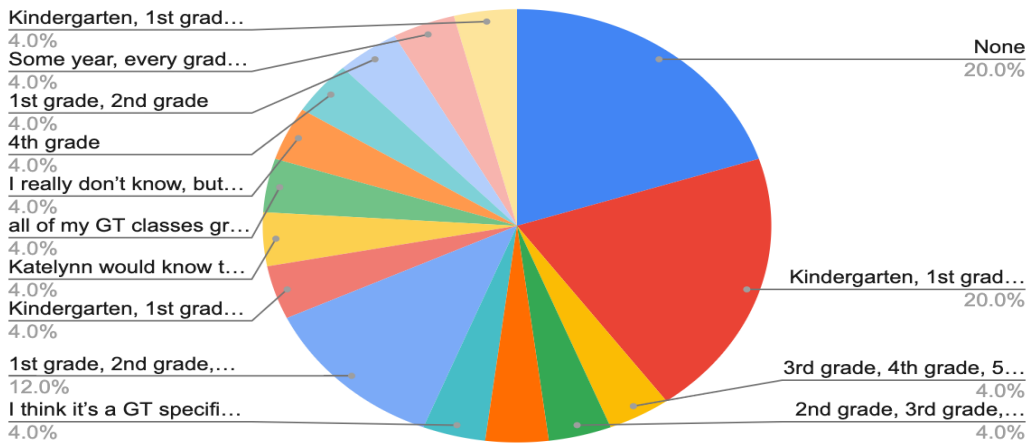
Count of Do you know of any coding apps or web sites that teachers use with students? If so, please list them.



Six people did not respond to this question. Two responses were 'No'. A few said that they did not know about it and for the rest of the responses, most answers indicated that they were using Code.org or Kodable.

Q9. Which grades at your school participate in Hour of Code?

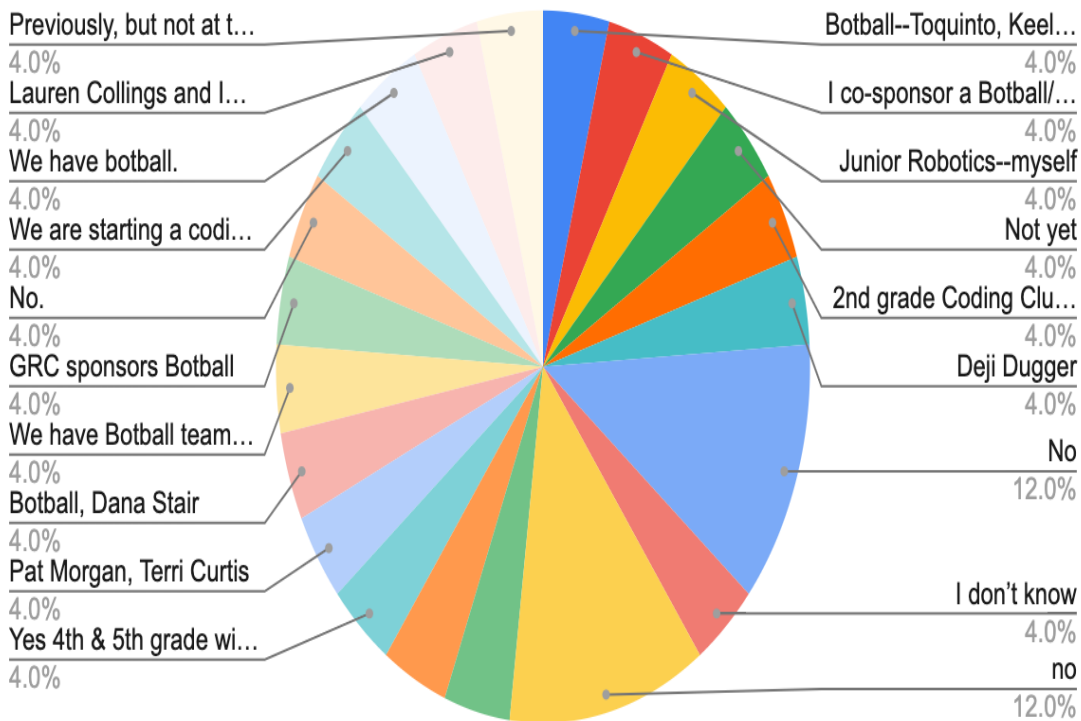
Count of Which grades at your school participate in Hour of Code?



There were diverse responses for this question again. Five people said that they did not have any grades participating in the Hour of Code, Two to Three people were not sure about answering this question. Most responses indicated that Pre K to 5th grade participated in the Hour of Code.

Q10. Does your site have a coding club of some type? If so, who is the teacher or sponsor?

Count of Does your site have a coding club of some type? If so, who is the teacher or sponsor?



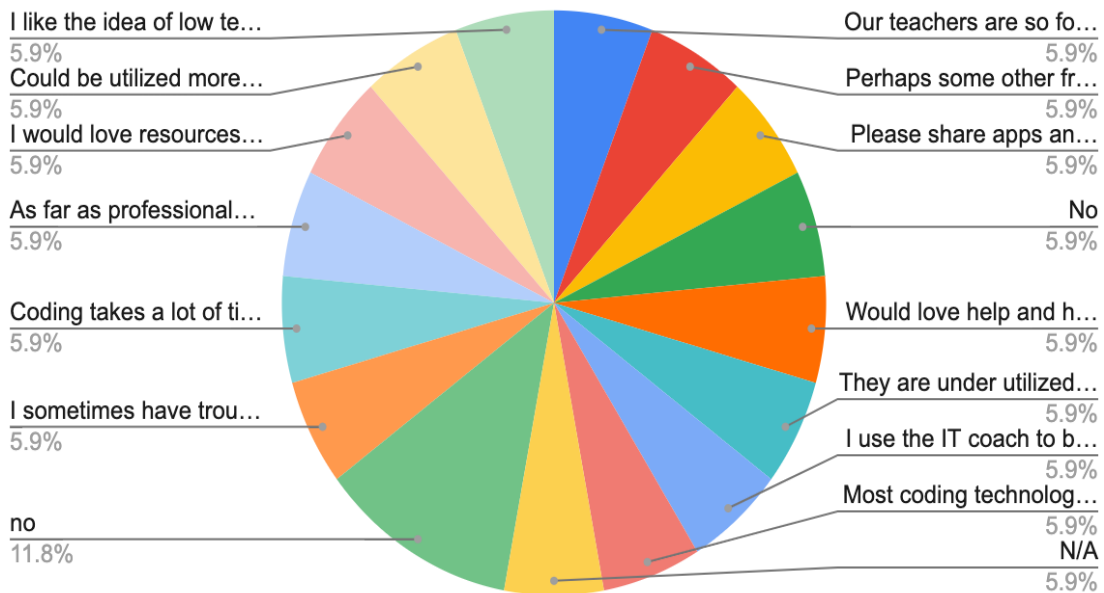
9 people responded 'No', one person did not know about it and others named different sites and coding clubs. Most common of them were Botball and Robotics Club.

Q11. Is there another teacher at your site we should contact or send this form to?

10 people responded 'No'. Others provided names of different teachers and concerned people.

Q12. Is there anything else we should know about your coding technologies and resources?

Count of Is there anything else we should know about your coding technologies and resources?



Nine people did not respond to this question. One responded as N/A. There were mixed responses. One person said that their teachers are too busy in district mandated interventions that they do not have time for coding. The rest of the people either explained about the situation of coding activities in their schools or showed their willingness to know more about the resources and information about coding.

Teacher Workshop Framework: (In progress)

After assessing the condition and number of these technologies, the next task was to design a training workshop for the elementary school teachers so that they are more comfortable using those technologies without facing much difficulties. Keeping in view the results of the survey, we understood that all schools did not have all the devices. We wanted to see which

device was most common in all the schools so that when we conduct training, all schools may possess that device. After a careful review of the survey, we found that the most common coding devices were Ozobots and Spheros. Therefore, we planned to use these two devices to implement the design of our training, and teachers will bring their own devices to the training. I had attended a Cricut Training workshop in the district in October 2022, where teachers brought their own devices to the workshop. That is why they got hands-on experience and things were easy to understand when they had their own devices with them. For this workshop, we are planning to conduct two or three sessions of the same workshop. The learners may be divided in groups and each session will be conducted for a maximum of 4 groups. The fewer the number of participants, the greater the opportunity will be for the learners to understand the content. We will propose a whole day for all three sessions, with participants attending just one session. Participants will have substitute teachers in their classrooms, so that they are not busy anywhere else during their time of the training.

Goal

The basic reason for designing instruction is to make possible the attainment of a set of educational goals (Gagne et al, 1916). The overarching goal of this workshop is to enable elementary school teachers to incorporate coding in their curriculum.

Learners' Analysis

In initiating a learners analysis, the important task for the designer is to identify those characteristics most critical to the achievement of the specific training objectives (Morrison et al, 2010). The learners for this workshop consist of librarians, gifted teachers, and some classroom teachers. The number of learners may range from 25 to 30. There may be 15 to 20 gifted

teachers, and 15 to 20 librarians and classroom teachers. We are expecting to have mostly librarians and gifted teachers.

Evaluation Plan

“The term *evaluating* refers to the process of using measurement or assessment to make judgements about something. The terms *measuring* and *assessing* are used interchangeably to denote the systematic collection of data about programs or people” (Morrison et. al, 2010). A post-survey will be conducted to evaluate the training. A post-workshop debrief for the trainers will be used to assess the understanding and development of the learners. The focus group of this training consists of librarians and gifted teachers. Regular meetings of this group will be conducted to reflect on students’ responses, students’ engagement in coding activities, what works, what needs to be changed, and how improvement can take place.

References

- Gagne, R. M., Briggs, L. J., & Wager, W. W. (1916). *Principles of instructional design (4th ed.)*. Holt, Rinehart & Winston.
- Morrison, G. R., Ross, S. J., Kalman, H. K., & Kemp, J. E. (2010). *Designing effective instruction (6th ed.)*. John Wiley & Sons.
- Siddiqui, K. A., Mughal, S. H., Soomro, I. A., & Dool, M. A. (2021). Teacher Training in Pakistan: Overview of Challenges and their Suggested Solutions. *IJORER: International Journal of Recent Educational Research*, 2(2), 215-223.