

TERM 2

DESIGN E-PORTFOLIO



Living Together in a Highly Interconnected World

Key Concept: Communities

Related Concept: Collaboration

Global Context: Globalization and Sustainability

Statement of Inquiry: Effective collaboration can be enhanced through design in a highly interconnected world.

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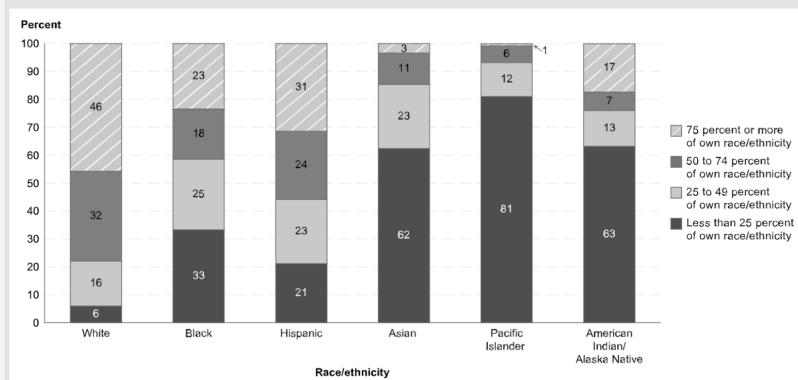
Criterion A - Inquiring and Analyzing

Strand I - Explain and Justify the Need for a Solution

Problem Scenario

Students in school often have a tough time working together and collaborating especially when they're new to the school and unfamiliar with each other. Schools include students from different cultural, geographical, and racial backgrounds. Learning to collaborate with different people at a young age is essential to enhance globalization, leadership and communication skills. According to the National Center for Education Statistics (America), the percentage of public school students who were White decreased from 54 to 46 percent between 2009 and 2020, showing a significant increase in racial diversity among public school students. The figure below shows diversity in American public schools as of the fall of 2019.

Figure 3. Percentage distribution of public elementary and secondary school students, by student's race/ethnicity and percentage of own racial/ethnic group enrolled in the school: Fall 2019



The data shows the immense diversity among students, and the need to establish a unified environment for enhanced collaboration and interconnectedness. Collaboration in schools enables students to work together cohesively to enhance the quality of work. During my time in the Middle Years Program, group activities have led to improved social and communication skills, and have allowed me to gain new knowledge from my peers that have influenced my work and achievements. However, it can be difficult to work with other students without being very comfortable around them.

Currently, students may find it difficult at young ages to adjust to working with new people. According to the Cleveland Clinic, 1 in 20 students suffer from Scolionophobia, the fear of school, and it is most common among students aged 5-6. Scolionophobia includes the fear of criticism, bullying, threats, or other potential hazards in a school setting. All of these fears make collaboration difficult to achieve.

As a new international student at my school in the 4th grade, it was difficult for me to collaborate with other students when given group activities. Being with people who were different from me (different accents, mannerisms, etc.) in a new environment was an overwhelming experience. During my first few weeks at my school, I was placed in groups for various team activities but wasn't able to effectively communicate my ideas and thoughts out of fear of being judged. A method of enhancing collaboration through activities prior to working as a team would be a beneficial way to improve communication among peers. In every new school year, ice-breaker activities are the primary method of allowing students to get to know each other. However, in my personal experience, some ice-breaker activities tend to be intimidating because they often involve students being forced to share things about themselves, and I was always unsure of what to say.

My target audience would be students aged 5-8. At this age, students are most likely to have a difficult time learning how to collaborate with their peers because of their young age. Being their beginning years of school, it would be difficult for young children to adapt because it involves adjusting and learning how to be open-minded with people of different backgrounds and understanding how to build up the courage to share ideas.

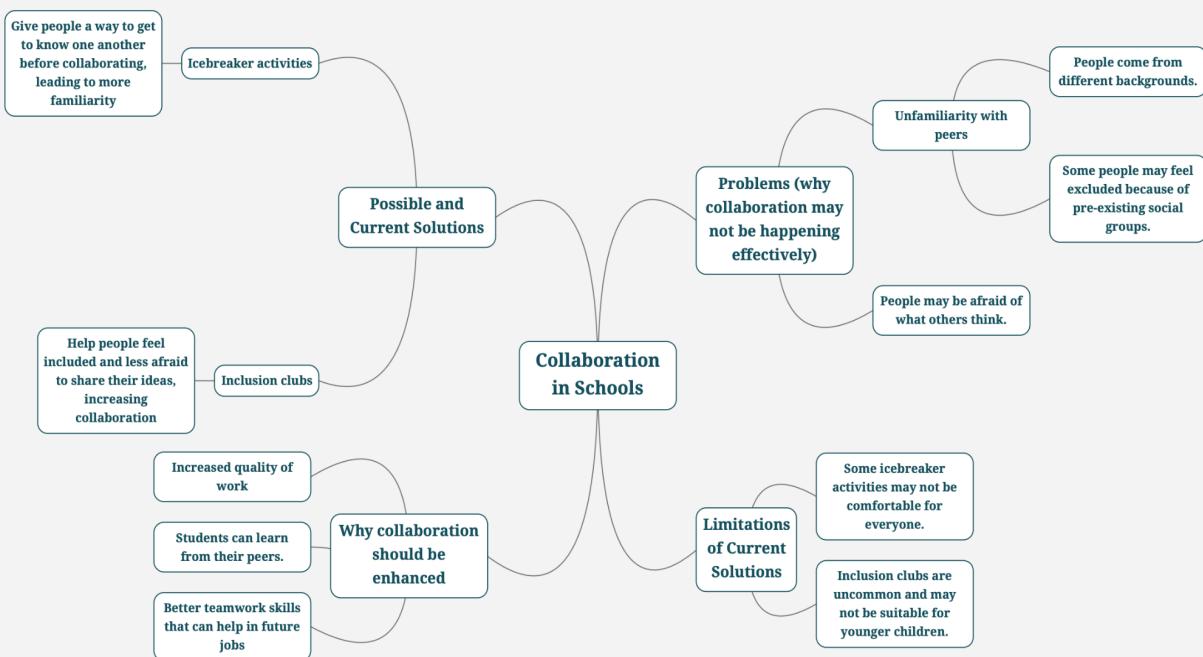
Problem Statement

Young students can have a **difficult time adapting to their new surroundings** which **impairs their ability to collaborate** with unfamiliar people, build effective relationships with their peers, and enhance their communication skills.

Strand II - Identify and Prioritize the Research

Mind Map

After identifying a prominent problem in schools, I created a mind map to effectively organize my information and help me better understand the problem at hand and its possible solutions. The below mind map below contains boxes of information intricately connected to help depict my problem, the importance of addressing it, possible and current solutions, and their limitations.



Link to mind map: <https://drive.google.com/file/d/1kvUVPjd97XerCa6SPzuKUzJB7ZDvfnmu/view?usp=sharing>

Research

To create a successful product, I would need a comprehensive collection of relevant information. To collect this information regarding both the problem and solutions, I created a list of questions that must be answered by my research and prioritized them according to their relevance.

Question	Prioritization and justification	Source
To what extent do young students feel scared to share their ideas with their peers?	<i>High</i> Developing an understanding of the extent to which the problem is present in society will lead to a better product that appropriately addresses the situation.	<i>Primary</i> Google Forms survey and interview with young student <i>Secondary</i> Reliable and relevant web articles

What are the current solutions to this problem and their limitations?	<i>High</i> Current solutions could be used as a reference for creating my product. Analyzing their strengths and weaknesses could provide me with insight into what features to include and what features not to include.	<i>Secondary</i> Web search to find existing products, followed by a SWOT analysis to determine the strengths, weaknesses, opportunities, and threats.
What are the requirements for a solution to successfully address the issue?	<i>High</i> While creating my product, I will need to know what qualities will help it effectively impact the situation.	<i>Primary</i> Google Forms survey <i>Secondary</i> Reliable and relevant web articles
Who is most affected by the problem?	<i>High</i> This would help me understand my target audience better and create a more appropriate solution.	<i>Secondary</i> Reliable and relevant statistics regarding collaboration in schools
What are the causes of limited collaboration in schools?	<i>Medium</i> This will help me address the root causes while creating my product. It will give me a better perspective of the problem and enhance my product but is not essential.	<i>Secondary</i> Online articles with relevant data to give insight into the causes.
What materials would be the most suitable to create the product?	<i>Medium</i> An appropriate material would increase the functionality of my product significantly. However, it is not of high priority because a wide range of materials could be used.	<i>Secondary</i> Reliable and relevant web articles
What aesthetic features would be most appealing to my target audience?	<i>Medium</i> Apart from its function, a product must have good quality aesthetics that are appropriate for the target audience. This would make the product more appealing, and increase its usage.	<i>Secondary</i> Google search to find existing products and analyse their aesthetic appeal, web search to find most appealing colors
What safety features must be considered?	<i>Medium</i> Safety is an integral part of any product and my final product should not pose a threat to its users. To ensure this, an understanding of safety precautions should be developed.	<i>Secondary</i> SWOT analysis of existing products
What challenges could be faced while implementing a solution?	<i>Low</i> This will help me prepare for any obstacles during the process of developing my product, but is not crucial because most challenges would be unpredicted.	<i>Secondary</i> SWOT analysis to understand the common issues faced with products and reliable websites pertaining to the research question
After the solution is implemented, what aspects could have been made better?	<i>Low</i> This would be an extension of my product and will not affect my initial process. However, it would give me valuable information to evaluate my product.	<i>Primary</i> Interview with student, expert appraisal, peer feedback

Strand III - Analyze Existing Products

Analyzing a range of existing products will help me understand the elements of a potentially successful or unsuccessful product. To most effectively analyse existing products, I will be using a SWOT Analysis, which stands for Strengths, Weaknesses, Values and Limitations.

Product 1 – Twister

Link:

https://www.amazon.com/Hasbro-98831-Twister-Game/dp/B008J87PVC/ref=sr_1_3?crid=KM1VEN0U1KKI&keywords=twister&qid=1669298562&sprefix=twist%2Caps%2C300&sr=8-3

Twister is a children's game where players are required to spin a wheel indicating which limb (right hand, left hand, left foot, right foot) needs to be placed on which color (red, blue, green, yellow). The goal of the game is to eventually reach an unachievable position in which the player loses. The game is for players over 6 years of age and comes with a vinyl mat, spin board, and instructions. It can be bought in stores and through online e-commerce websites. The game is suitable for 2-4 players and costs \$15.97 on Amazon.



SWOT Analysis

Strengths: <ul style="list-style-type: none">The product has simple instructions without any complex parts. This makes it a more appealing product.The concept of the game is well-suited for children because it involves physical movement.The game can be used as an icebreaker for children who are unfamiliar with each other because it could lead to humorous moments that could create a bond among students, enhancing their future collaboration.	Weaknesses: <ul style="list-style-type: none">The product has a very limited number of players which makes it less suitable for schools where classes normally have over 20 students.The age is 6+, and a lot of students begin school at the age before then, making it unsuitable for them.The product has very limited verbal communication, making it less effective when it comes to eliminating the fear of speaking among new classmates.
Opportunities: <ul style="list-style-type: none">The vinyl mat could be slightly bigger to make it suitable for more players.The product could be made more easily available internationally, as it is only commonly available in the United States. In other countries, it is either unavailable or unreasonably expensive, making it a poor choice for schools that may not have the budget.	Threats: <ul style="list-style-type: none">Because there is physical movement involved, there is a risk of injury.If too many people play the game, there could be a higher risk of hitting/kicking each other.There could be hygiene issues due to people putting their hands and feet on the same mat.Because the game involves physical activity, it could lead to embarrassment, making students more fearful of bullying.

Product 2 – Telestrations

Link:

https://www.hamleys.in/product/funko-telestrations-multi-color-491277578?utm_source=google&utm_medium=cpc&utm_campaign=SOK_Performance_Max_C2_New_181122&utm_adgroupname=&utm_term=&camp_id=18958501587&camp_type=PerfMax&gclid=CjwKCAiAqaWdBhAvEiwAGAQLtqgzL5uawTiph9POCKxc6sWfkD6kIEGbLN8Bt6aER-9Kg-St8FZfqBoC9oYQAvD_BwE

Telestrations is a board game in which players are given paper and markers and are expected to draw. Other players guess what each other drew and take turns either drawing what another player guessed, or guessing what another player drew. The game is for ages 8+, and for 4-6 players. The product costs ₹ 899 on Hamleys in India. It comes with 200 cards, erasable sketch books, markers, instructions, dice, and cloth to erase.



SWOT Analysis

Strengths:

- Because it is a non-verbal game, it puts less pressure on people to talk which could make it less overwhelming while getting to know people.
- It works effectively as an icebreaker because it allows students to communicate and get to know one another.
- The game is humorous, allowing students to bond more effectively.
- It is a less straightforward way of getting to know each other, making it less intimidating as compared to ice-breaker activities in which students are forced to share.

Weaknesses:

- Because it is a non-verbal game, it might limit the amount of communication between peers.
- It is intended for ages 8 and above, making the product less impactful on younger children who tend to face more difficulties in collaboration.
- It only supports 4-6 players making it less usable in a classroom environment that consists of a minimum of 20 students.
- It is somewhat costly, so it would be unlikely for it to be purchased.

Opportunities:

- The rules could be more simple to make the game more attractive to children.
- The product could be more easily available because it is not there on common e-commerce websites like Amazon and is expensive.
- The aesthetics of the product could be improved.

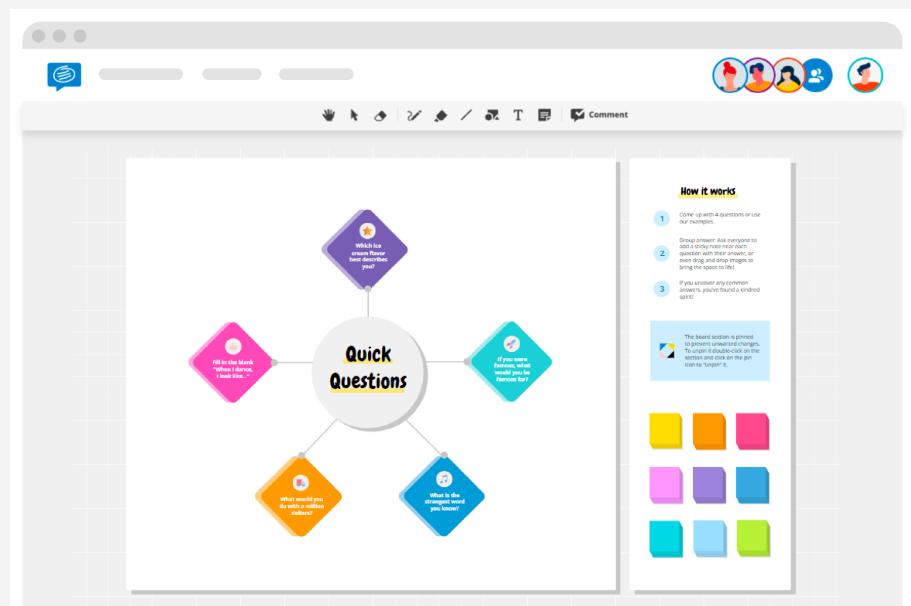
Threats:

- The product is not eco-friendly because it contains an extensive amount of plastic which could be harmful to the environment.
- There are a lot of small pieces which could easily get lost.
- The small pieces might be dangerous because they could be a choking hazard.
- Because the game depicts a student's strength in terms of their ability to draw and guess drawings, students may be afraid of the impression they make on others.

Product 3 – Quick Questions (Online Game)

Link: <https://conceptboard.com/blog/icebreakers-in-virtual-teams/>

Quick Questions is an online game in which a set of questions is provided and can be customized. Players are required to answer the questions on a shared link to find people with similar answers. The game does not specify an age category or player limit. It was developed by Concept Board and is free to access. The game includes a typing tool to add answers and the instructions are located at the right of the screen while playing the game.



SWOT Analysis

Strengths:

- The game is free to play and available online so it is easy to access for teachers or other school staff.
- The game allows students to get to know each other better, making it a good icebreaker activity.
- It has simple instructions, making it appropriate for young children.
- The interface is simple and easy to navigate through. It also includes color options for customization which enhances aesthetics and the user experience.

Weaknesses:

- Students may not have access to a suitable device such as a laptop or tablet in school, hence they may not be able to play the game.
- If a student does not know the answer to a question or does not have one, it could put pressure on them to think of something.
- The game does not include a fun or entertaining aspect to it.

Opportunities:

- The game could be less straightforward and include something to make it more interactive and entertaining.
- A physical version of this game could have been made to make it easier to use in a school.
- The game could be more aesthetically appealing/appeal to children through bright colors and pictures.
- The game could mention a specific age group to help teachers easily determine whether it's appropriate for school children.

Threats:

- Because the goal of the game is to find other students with similar answers to the questions, some people might feel left out if they do not find any.
- Because the game is online, there is a possibility of students misusing the anonymity.
- Because the game does not include an age range, it could potentially contain inappropriate content.

Product 4 – Wavelength

Link: <https://www.amazon.com/Monikers-WAV01-Wavelength/dp/B07T446163>

Wavelength is a party game in which players are expected to attempt to reach each other's minds. It was designed by Wolfgang Warsch, Alex Hague, and Justin Vickers. It is recommended for ages 14+, and accommodates 2-12 players. It takes 30-60 minutes to play and its contents include 1 plastic device, 84 Wavelength cards, 42 Advanced cards, 1 Rulebook and 3 Scoring tokens. It costs \$34.99 on Amazon. An online version of the game is also available.



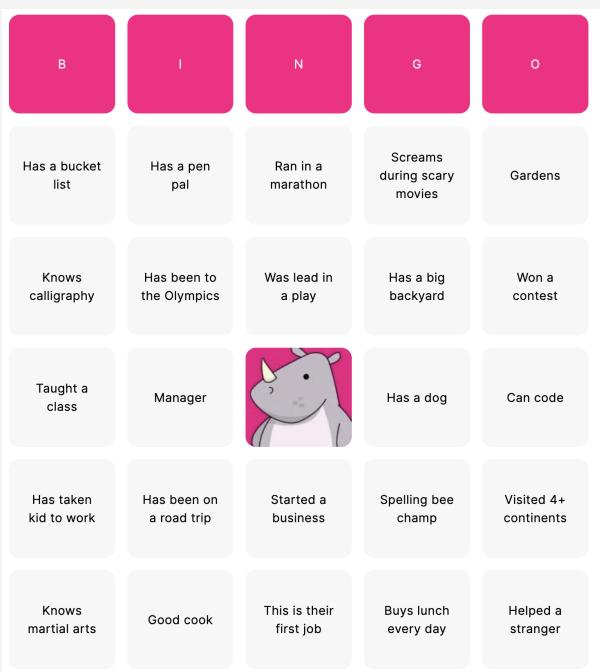
SWOT Analysis

Strengths: <ul style="list-style-type: none">- Because the game is available both physically and online, it makes it easier to access.- It is a team game, so it would help improve teamwork.- The concept of the game is unique and would be entertaining to play.- The aesthetics of the game makes it stand out, making it more likely for people to buy it.	Weaknesses: <ul style="list-style-type: none">- The game is expensive and is likely to be out of a school's budget.- The game is unsuitable for large groups because there are two teams, and the way the game is played could make people left out.- The rules of the game are complicated, making it less adequate for young children.- Because it is recommended for ages 14+, it may be difficult for young children to play.
Opportunities: <ul style="list-style-type: none">- The game could be better designed to accommodate more players because the rules are such that all players do not need to participate.- The game could have more straightforward instructions.	Threats: <ul style="list-style-type: none">- The game includes pieces that are easy to lose or break, especially when children use it.- It contains an extensive amount of plastic that could be damaging to the environment.- Because it is recommended for ages 14+, it may contain content that is inappropriate for children or inappropriate in a school setting.

Product 5 – Ice-breaker Bingo (Online Game)

Link: <https://teambuilding.com/blog/icebreaker-bingo>

Ice-breaker bingo is an online game in which players are given a Bingo card. They are able to click on squares to mark them off. The squares have things that can be used to describe a person. This includes abilities, experiences and items they own. The game intends to allow groups of people to get to know each other better through these things. To play the game, people are required to find people who match the description on the square in order to mark it off. For example, if a square on a card says ‘Has a pen pal’, a player has to find someone who has a pen pal to mark it off. The game is accessible through teambuilding.com and is free to use. A new card can be generated if needed.



SWOT Analysis

Strengths:

- It gives players the opportunity to mingle and talk which can enhance communication in a group of students.
- Because of its nature, the game allows people to get to know each other and learn facts about each other.
- The game is free, making it more accessible to teachers/facilitators.
- The game is simple and has a straightforward objective.
- It works well as an ice-breaker to encourage team-building when compared to other games.
- The product uses bright colors which make it aesthetically appealing.

Weaknesses:

- The game is not intended for students and is more aimed toward coworkers. This means that some of the squares on the Bingo cards do not apply to students.
- In school, students may not have access to a device with which they can play the game.
- The concept of the game is not very unique and because it is free, it is not profitable.

Opportunities:

- A physical version of the game could have been made to make it easier to play.
- The game could have been easier to find online as it is included in a blog that teachers are unlikely to find.
- The game could be more aesthetically appealing/appeal to children through bright colors and pictures.

Threats:

- Young students might feel upset or discouraged if they cannot win the game.
- Because it is online, children could be exposed to pop-up ads or open sites that are unnecessary to the game. They could also misuse the internet or use their device for other things.

Strand IV - Develop a Design Brief

Summary of Primary Research

To conduct primary research, I created a Google Form to collect information from my classmates' experiences with reference to my research questions. I was able to collect information on how prominent the problem is and how to go about creating a solution. The respondents are students my age who have all gone through a point where they were new to a school. This was an appropriate sample because all of them have insights into what issues students face when collaborating with unfamiliar people. The link to the form used and the responses are located in the appendix (Appendix: Exhibit A).

Findings from the survey:

- 100% of respondents were afraid of sharing their thoughts and ideas with their peers when they first started school.
 - Upon asking them to rate their fear on a scale of 1-10, 71.4% of respondents rated it a 7 or higher. 100% of respondents rated it a 5 or higher.
- 100% of respondents felt that an ice-breaker activity would help increase collaboration.
 - On a scale of 1-10, 42.9% rated it a 10 in terms of how effective they think it would be. All respondents rated it a 5 or higher, with 86% rating it a 7 or higher.
- Respondents believe that a product should:
 - Be engaging and interesting
 - Include hands-on activities
 - Include some form of teamwork
 - Improve relationships between peers
 - Be unique
- 71.4% of participants believe that a physical product would suit this scenario best compared to a virtual (online) product.
- Potential products include:
 - A puzzle involving teamwork
 - A board game
 - A card game

Summary of Secondary Research

To conduct secondary research, I pursued numerous web searches to collect information from reliable websites (can be found in the Bibliography). This allowed me to gain less specific information on the problem and insights into potential solutions. Using 5 existing products, I analyzed them in terms of their strengths, weaknesses, opportunities, and threats. This step of my research will help me in the development of my final product by showing me both the good and bad features to include/not include.

From my research, I was able to conclude that:

- Schools include students coming from different places who may be unfamiliar with the culture, language, or mannerisms of the school, making it essential to eliminate any fears students may have when it comes to collaboration.
- Games are the most commonly used products for ice-breaker activities.
- There are not many products that account for more than 20 students, which would be ideal in a classroom.
- Majority of products are some sort of game.
- Successful products are easy to use because of their simple rules and entertaining nature.
- Unique products tend to have more demand.
- A common opportunity observed in the products was that they could be cheaper and more easily available to purchase.
- The most aesthetically appealing colors to young children are bright colors (red, yellow, blue, purple, pink, green).
- A successful product should encourage communication among peers rather than forcing it.

Design Brief

From my primary research, I was able to collect data from people around me. This helped me determine different aspects of the creation of my final product and gave me first-hand information about the problem itself. However, this data was from people my age while my product is intended for younger ages. After identifying this limitation, I consulted secondary sources for more elaborate and specific information regarding my problem scenario and the potential solutions I could go about creating. From this extensive research, I decided to create a **physical game** that adheres to the following requisites:

1. The product should include teamwork that encourages students to communicate with each other. *This will help ensure that the students become more comfortable with their surroundings, enhancing future collaboration and teamwork.*
2. It should have some form of physical activity to make it a quality experience for the players. *This makes the game more engaging and interactive because children are often more drawn to activities where they have to move around.*
3. The game should appeal specifically to younger students who are more likely to face issues while collaborating. This primarily encompasses children aged 5-8. *The game must be appropriate for my target audience so that it has specific aspects specifically aimed at the most affected age group.*
4. Because classrooms typically consist of 20 or more students, the game should be able to accommodate that many players.
5. The game should be appropriate for a classroom environment and for young children. *The game should be appropriate in terms of vocabulary, content and instructions to ensure that the game is successful because an inappropriate game is likely to not be approved or used by teachers.*
6. It should include detailed and simple instructions that make the gameplay fun and simple. *If the instructions are too complex, young children may have a hard time understanding how to play the game. At the same time, if they are not detailed, there would not be enough information on how to play.*
7. The manufacturing of the materials should not be harmful to the environment. *Manufacturing games can be harmful to the environment because they have plastic packaging or plastic items inside. Because plastic is nonbiodegradable, it could be harmful to the environment if the game is thrown out.*
8. The materials should be durable considering the rough use commonly seen in children. *Young children are prone to dropping objects or misusing them. With this in mind, the items in the game should be durable to withstand these circumstances.*
9. The game pieces should not be easy to lose and be safe for children. *Small objects can be a choking hazard and can be easily lost. This could impact the safety of children and gameplay.*
10. It should be easy to afford considering the limited budgets of some schools.
11. The game should be aesthetically pleasing and follow a color theme that appeals to young children. *Children would be more interested in playing a game that is aesthetically pleasing. If children play the game more, the problem is more likely to be minimized.*

Criterion B - Developing Ideas

Strand I - Develop a Design Specification

A successful product needs to have certain features that make it a success. To measure how well my final product impacts the problem scenario, a detailed list of ideal features (ACCESSFM) will be used. This will serve as the set of requirements to make my product successful and will help me go about the creation of my product in the most suitable manner.

ACCESSFM

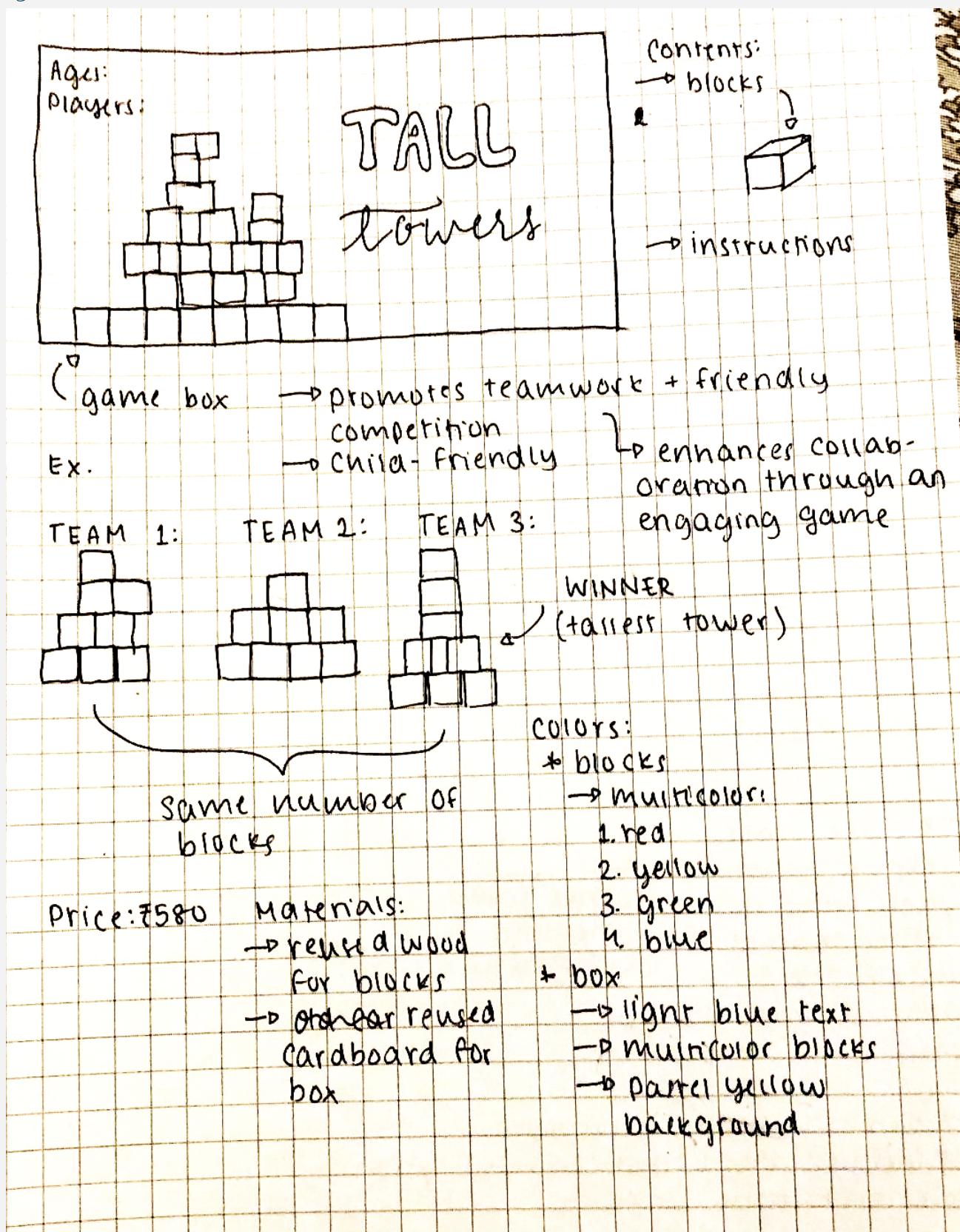
Element	Specification	Grading Scale
Aesthetics	The product should include bright colors to appeal effectively to young children. It should also stand out against other similar products in terms of aesthetics to those who are purchasing it.	_ /10
Cost	The product should be relatively cheap considering that schools have a limited budget or other priorities. With this in mind, the product should not cost more than ₹600.	_ /10
Customer	The target audience for the product is children aged 5-8, and those purchasing it are likely to be middle-aged adults who work with children. This means that the instructions of the game should be simple enough for a 5-8-year-old child to understand, and it should stand out to middle-aged adults.	_ /10
Environment	The product should be made mostly out of reused or eco-friendly items. Plastic content should be limited and the packaging should not be too bulky.	_ /10
Size	The game should be big enough (have enough materials) to accommodate at least 20 people. The dimensions of the product should be such that it is easy to store in a classroom.	_ /10
Safety	None of the game pieces should be a choking hazard to young children. There should be no sharp objects included and no electricity involved to avoid any accidents.	_ /10
Function	The game should involve some form of communication among the players while not putting pressure on players to speak on the spot. This should help the students feel more comfortable collaborating with one another. The game should be straightforward, easy to play, and fun. It should not take longer than an hour to complete. The game is also hands-on to increase its interactivity.	_ /10
Material	The game should primarily consist of materials like paper, cardboard, and wood to account for cards, the board (if there is one), packaging, and game pieces.	_ /10

Success Criteria

Criteria	1-2	3-4	5-6
Customer	<ul style="list-style-type: none"> - The game's rules are too complicated for young children to play. - The colors are not adjusted to the liking of young children (bland or dull) - The game is boring or confusing. - The game is not at all suitable for the target audience. 	<ul style="list-style-type: none"> - The game's rules are simple enough for young children to understand but could be more straightforward. - The colors are somewhat appealing to young children but could be more colorful. - The game is entertaining, but might be somewhat boring. - The game is appropriate for children aged 5-8, but more suitable for older or younger age groups. 	<ul style="list-style-type: none"> - The product has simple and straightforward rules. - It appeals to young children through its colors and overall aesthetics (shapes, fonts, etc.) - The game is entertaining enough so that children aged 5-8 do not get bored or confused. - The game is age-appropriate and does not contain any content that would be considered inappropriate, especially in a school environment.
Function	<ul style="list-style-type: none"> - The game does not involve communication or teamwork. - The concept is boring or already exists. - There is no collaboration involved and students are unable to familiarize themselves with each other. - The game components are of poor quality 	<ul style="list-style-type: none"> - The game incorporates either communication or teamwork. - It has a unique concept, but similar products already exist. - The game objective allows some extent of collaboration. - The game components are of adequate quality. 	<ul style="list-style-type: none"> - The game encourages teamwork and communication. - The concept of the game is original and has humor to a certain extent. - It allows students to collaborate and get to know each other better. - The game components are of exceptional quality.
Accessibility	<ul style="list-style-type: none"> - The price is over 700 INR. - Not all types of people are able to play the game because it doesn't account for those who are disabled either physically or mentally. 	<ul style="list-style-type: none"> - The price is not more than 700 INR. - The game is playable by all types of people (Doesn't include much physical movement because schools may have students who are physically disabled.) 	<ul style="list-style-type: none"> - The price is not more than 600 INR so it's affordable for teachers/schools. - The game is playable by all types of people (Doesn't include much physical movement because schools may have students who are physically/mentally disabled.)
Aesthetics	<ul style="list-style-type: none"> - The game is not at all aesthetically pleasing, reducing the possibility of purchase. - The colors are either too vibrant or too dull. 	<ul style="list-style-type: none"> - The game's aesthetics make it somewhat appealing to buyers/customers. - Mostly bright and vibrant colors are used but are somewhat disturbing. 	<ul style="list-style-type: none"> - The game's aesthetics make it appealing to buyers/customers. - Bright and vibrant colors are used without making it too disturbing.
Total	The final product should score at least 18/24 to be successful		

Strand II - Develop Design Ideas

Design Idea 1



In this game, players are divided into groups of 3-5 with the objective of building the tallest tower. The game aims to encourage players to collaborate toward achieving their goals. The game will be 100% made of reused items.

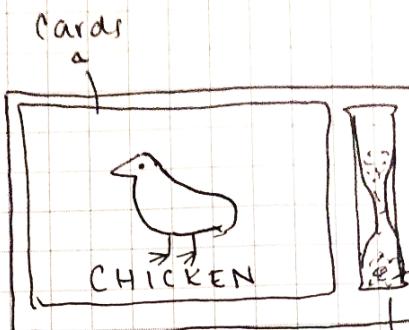
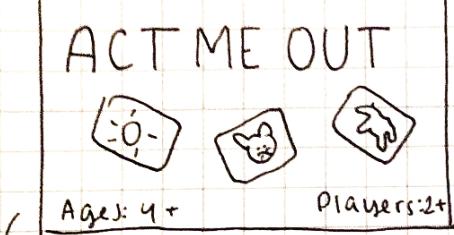
Design Idea 1 - Evaluation

Element	Score out of 10	Justification
Aesthetics	8	<ul style="list-style-type: none"> - The blocks are simple and aesthetically pleasing. - The outside of the box is somewhat appealing.
Cost	8	<ul style="list-style-type: none"> - The game is within a reasonable price range, but could be cheaper.
Customer	10	<ul style="list-style-type: none"> - The concept of the game is simple, adhering to the needs of young children - The game includes physical objects which can make the game more interactive.
Environment	10	<ul style="list-style-type: none"> - The game is made completely out of reused materials, reducing the carbon footprint of production. - It is plastic free and all materials are biodegradable.
Size	9	<ul style="list-style-type: none"> - The game effectively packages its contents. - It could be smaller as it may be difficult to store in a classroom. - It accommodates over 20 students.
Safety	6	<ul style="list-style-type: none"> - The game includes pieces that have sharp corners or could be a choking hazard. - The pieces could also get lost easily.
Function	8	<ul style="list-style-type: none"> - The game adheres to the purpose of encouraging collaboration among teammates. - After the game is played once, it could become boring.
Material	10	<ul style="list-style-type: none"> - All materials are suited to their purpose. - The game will consist of wood for the blocks, cardboard packaging and paper for the rules.

Total: 69/80

Design Idea 2

Acting Game



Inside
a)

timer

Price: € 200

Contents:

→ 70 cards

→ Instructions

→ Timer (hourglasses)

Materials:

* paper

* Cardboard

com Colors:

Box:

* yellow

* blue

* pink

* green

cards:

* white background



House



triangle

Other team members (guessing)

house

rest of the class

watching (other team))

→ If the other team members guess what is being enacted within the allotted time, the team gets a point

→ game promotes collaboration

→ includes non-verbal communication

→ Entertaining

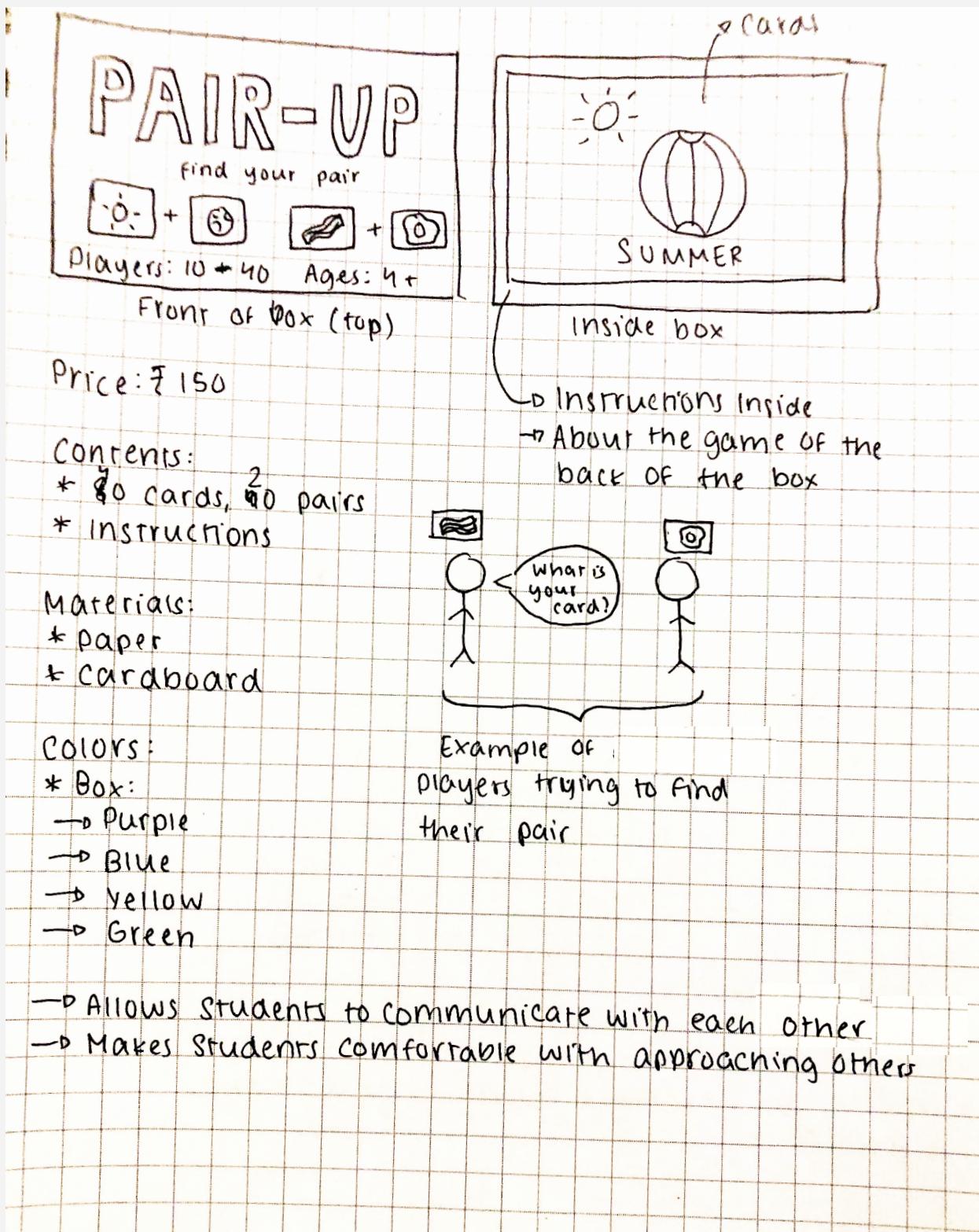
The concept of the game is similar to charades. Students are divided into teams, and one player from each team takes a card with something they have to enact. The other team members attempt to guess (in front of the rest of the class) the team that guesses the most cards wins.

Design Idea 2 - Evaluation

Element	Score out of 10	Justification
Aesthetics	9	<ul style="list-style-type: none"> - The packaging is aesthetically pleasing and bright colors are used frequently - It does not stand out much compared to other card games.
Cost	9	<ul style="list-style-type: none"> - Because it only consists of cards, it is cheap and easy for teachers to purchase. - Being 200 INR, it falls in the appropriate price range.
Customer	8	<ul style="list-style-type: none"> - The concept of the game is appropriate for children because it incorporates actions and the cards include child-friendly prompts. - Because it involves physical actions, children who are physically disabled may be unable to play the game.
Environment	9	<ul style="list-style-type: none"> - The product does not contain any plastic and all materials are biodegradable. - Production would not result in any environmental damage.
Size	10	<ul style="list-style-type: none"> - The box would be small because it only has cards, making it extremely easy to store. - There are enough cards to support all children and be played multiple times.
Safety	8	<ul style="list-style-type: none"> - The materials of the game are safe and would not result in injury or choking. - While acting, there is a possibility of injury. - Students may feel embarrassed or pressured to enact the cards.
Function	7	<ul style="list-style-type: none"> - The game promotes team-building and non-verbal communication. - The game does not include much verbal communication and students do not have the opportunity to learn about each other.
Material	10	<ul style="list-style-type: none"> - The materials are appropriate for the purpose (cardboard for the box and paper for the cards) - They are eco-friendly.

Total: 70/80

Design Idea 3



In this game, players are given cards with words on them. Each person gets one card. Each card has a pair. For example; winter and summer, salt and pepper, big and small, etc. Players are required to find their pair.

Design Idea 3 - Evaluation

Element	Score out of 10	Justification
Aesthetics	10	<ul style="list-style-type: none"> - The cards have an aesthetic appeal to them because they have bright images on them and the formatting is structured. - The box includes fonts and colors which are both aesthetically pleasing and appealing to children.
Cost	10	<ul style="list-style-type: none"> - Because the game only consists of cards and instructions, there are minimal materials required, making the cost only 150 INR which is well below the maximum price.
Customer	8	<ul style="list-style-type: none"> - The concept of the game is simple, making it easy for children to play. - The game could be boring because the concept of the game is too straightforward and would not be very fun.
Environment	10	<ul style="list-style-type: none"> - The game has minimal materials and only consists of paper which is biodegradable. The packaging is also small and is made of reused cardboard, making it have a minimal carbon footprint.
Size	10	<ul style="list-style-type: none"> - The game is extremely compact because it only has cards that do not have a lot of content. This quality makes it extremely easy to store - It accommodates over 20 students.
Safety	9	<ul style="list-style-type: none"> - The game does not contain any sharp objects - It does not pose any sort of threat to the players - The cards could be easily damaged or lost.
Function	8	<ul style="list-style-type: none"> - The game allows the children to communicate with each other and helps them familiarize themselves with one another to a certain extent. - It does not allow them to get to know each other.
Material	10	<ul style="list-style-type: none"> - The cards are made of paper and the box is made of cardboard. These are the most suitable for their purposes.

Total: 75/80

Design Idea 4

FIND the ANIMAL

Animals:

- ↳ Lizard: 20 points
- ↳ Snake: 25 points
- Elephant: 10 points
- Dog: 15 points

Price: ₦ 300

Contents:

- 5 toy animals
- instructions

Materials:

- plastic
- paper
- cardboard

Colors:

Box:

- brown
- yellow
- white
- gray

* Invokes friendly competition
* makes children more comfortable with their surroundings

This game consists of toy animals worth different points. One player hides the animals in different areas of the classroom. Other students are required to find these animals and they acquire the respective points.

Design Idea 4 - Evaluation

Element	Score out of 10	Justification
Aesthetics	8	<ul style="list-style-type: none"> - The packaging is aesthetically pleasing and uses bright colors. - The game pieces are appealing to young audiences. - The packaging could more adhere to young children through a brighter color scheme.
Cost	9	<ul style="list-style-type: none"> - The game is cost-effective because it includes very few parts. - It costs 300 INR, making it below the limit, however, if the materials for the parts were different, the price could be lower.
Customer	9	<ul style="list-style-type: none"> - The simplistic nature of the game makes it suitable for young children, yet entertaining for older age groups. - The game could include communication among players to make it more enjoyable.
Environment	6	<ul style="list-style-type: none"> - The game pieces are made of plastic, which is harmful to the environment. - There are few pieces and it has small dimensions, limiting resource use.
Size	10	<ul style="list-style-type: none"> - The game is small because it only includes small objects and the instructions which helps it fit in a small box. - It accommodates over 20 students.
Safety	8	<ul style="list-style-type: none"> - The game is relatively safe and does not pose any threat to the players. However, the smaller game pieces could be a choking hazard, especially for younger children.
Function	5	<ul style="list-style-type: none"> - The game does not include any communication which makes it less appropriate as an ice-breaker. - It does not allow students to get to know each other in any way.
Material	6	<ul style="list-style-type: none"> - The plastic used is harmful to the environment, but the materials used are relatively suitable for their purpose.

Total: 61/80

Design Idea 5

Spinner Game

ASK ME!

Contents: price: €300

- * 40 cards
- + 1 spinner
- * instructions

Materials:

- * Plastic
- * cardboard
- * paper

Colors:

Box:

- yellow
- red
- blue
- green

Spinner:

- red
- purple
- blue
- yellow
- white
- green
- orange
- black

→ helps Students learn about each other
 → improves communication skills
 → improves Speaking Skills
 → Makes students more comfortable with each other

→ Spinner pointing at students
 → picks card & answers question
 → Students

→ inside the box
 → instructions
 → cards

This game consists of a spinner and cards. Students sit in a circle around the spinner and whoever the spinner lands on has to pick a card. The cards have simple ice-breaker questions that the student has to answer.

Design Idea 5 - Evaluation

Element	Score out of 10	Justification
Aesthetics	9	<ul style="list-style-type: none"> - The game parts and box both have an aesthetic appeal to them. - Appropriate colors are used. - The spinner looks slightly bulky, which reduces the aesthetics of the product.
Cost	9	<ul style="list-style-type: none"> - The primary aspect of the game is the cards, which are made of paper and are cheap. - The spinner adds slightly to the cost because it is made of cardboard and plastic. - With a price of 300 INR, it falls within the appropriate range but could be improved.
Customer	7	<ul style="list-style-type: none"> - The game is appropriate for children. - It could be boring to simply answer questions without any game objective. This makes it less engaging for children. - It could also be intimidating to be put on the spot to answer the questions.
Environment	5	<ul style="list-style-type: none"> - The spinner includes plastic and the cards and spinner are also wrapped in plastic. - Because the packaging is slightly large, it requires more resources and increases pollution during production.
Size	9	<ul style="list-style-type: none"> - Although the box is wide, it is thin, making it easy to store in most places. - It accommodates over 20 students.
Safety	10	<ul style="list-style-type: none"> - None of the game pieces are harmful in any way, and although the cards could be lost, it would not affect the gameplay.
Function	8	<ul style="list-style-type: none"> - The game effectively introduces students to each other. - It does not include any engaging aspects to it that solve the problem.
Material	7	<ul style="list-style-type: none"> - Most materials are well-suited, but there could be less plastic use in the packaging.

Total: 64/80

Strand III - Present the Chosen Design

ACCESSFM Results

Element (ACCESSFM)	Design Idea 1 Score (/_10)	Design Idea 2 Score (/_10)	Design Idea 3 Score (/_10)	Design Idea 4 Score (/_10)	Design Idea 5 Score (/_10)
Aesthetics	8	9	10	8	9
Cost	8	9	10	9	9
Customer	10	8	8	9	7
Environment	10	9	10	6	5
Size	9	10	10	10	9
Safety	6	8	9	8	10
Function	8	7	8	5	8
Material	10	10	10	6	7
Total	69	70	75	61	64

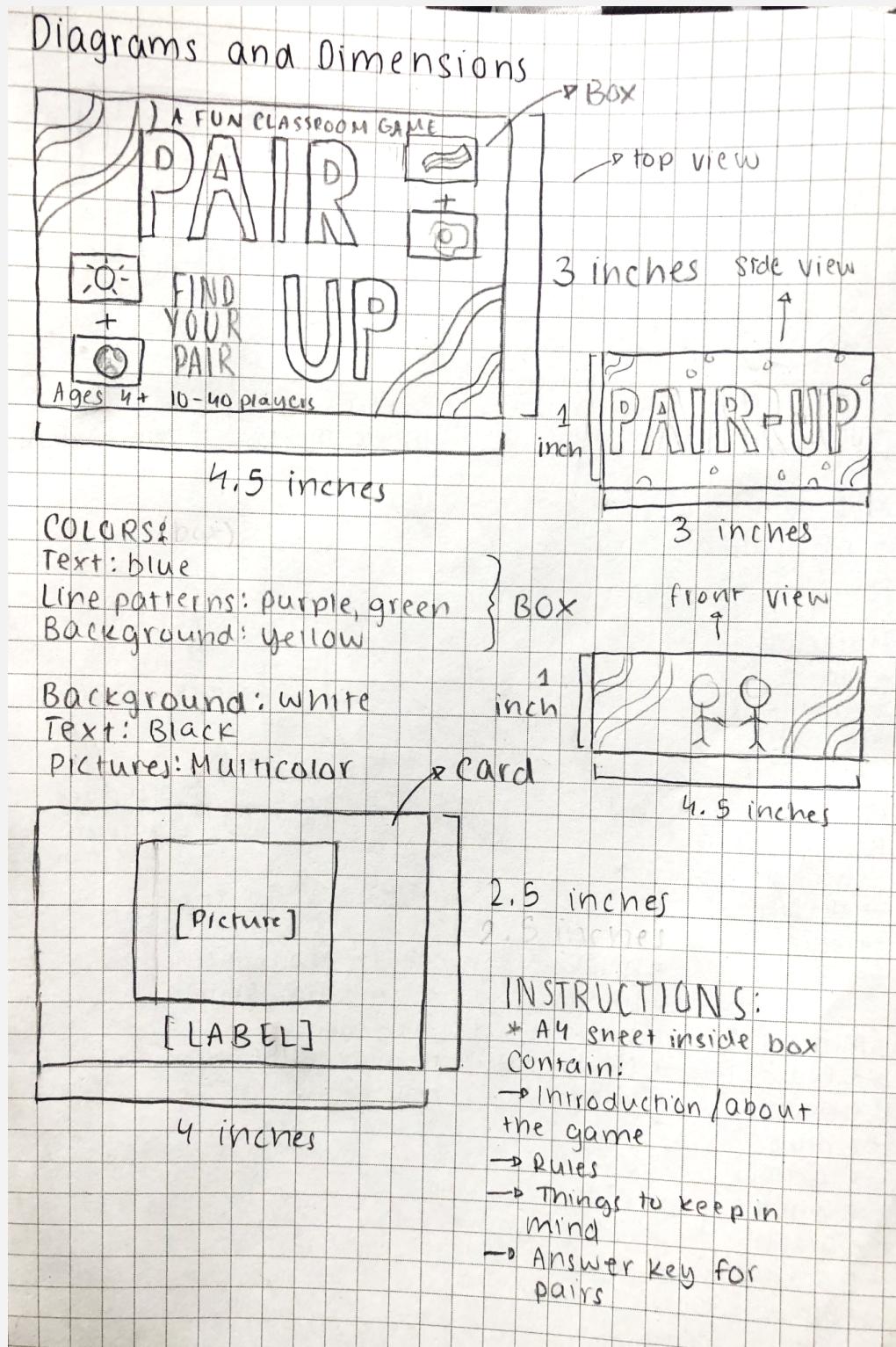
Justification of the Chosen Design

With a score of 75 out of 80, Design Idea 3 scored the highest while evaluating with ACCESSFM. ACCESSFM analyses the product in terms of various different criteria, making it an effective way to evaluate the product's potential success. Design Idea 3 most appropriately addresses my problem scenario and will likely be the most effective in solving the issue. The design encourages teamwork and communication through a fun and interactive game. The product will contain cards and detailed yet simple instructions for straightforward gameplay. The objective of the game is to find the person who has the opposite card which would promote collaboration and communication. This addresses my problem scenario the best compared to the other ideas.

Strand IV - Develop Planning, Drawings or Diagrams

Diagrams and Dimensions

After analyzing all my chosen designs using ACCESSFM, I was able to conclude that this design best fits the requirements for my product. To help me plan my design and give myself a blueprint for my final product, I created a detailed outline of all the different aspects that will be incorporated into my product.



Product Details

Brief overview of instructions:

1. Depending on the number of players, sort the cards such that every card distributed has a matching one. (If there are an odd number of students, the teacher will take part, otherwise, only the students will play).
2. Cards will be shuffled and distributed among players.
3. Players will interact with each other to find the person with the matching card.
4. The game ends when everyone finds their pair.
5. The pairs will be checked with the answer key.

Isometric projection of box (with dimensions):

Resources:

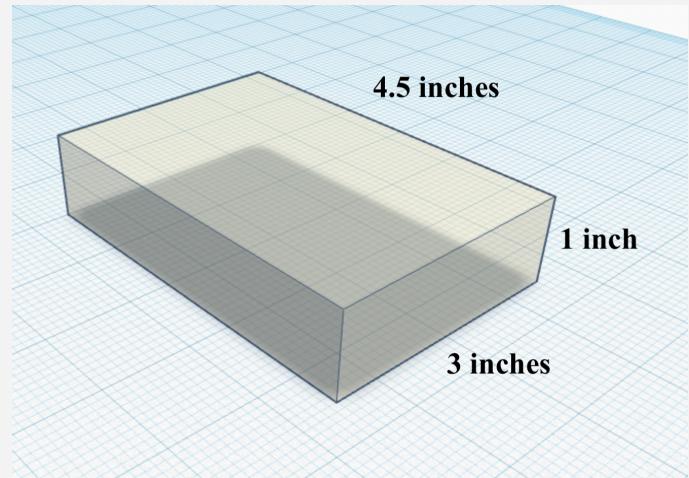
1. Websites to find pair words
2. Scissors to cut the sides of the box and the cards
3. Pencil to outline drawings
4. Colored pencils and markers to outline the drawings
5. Laptop to type out instructions
6. Printer to print instructions

Materials:

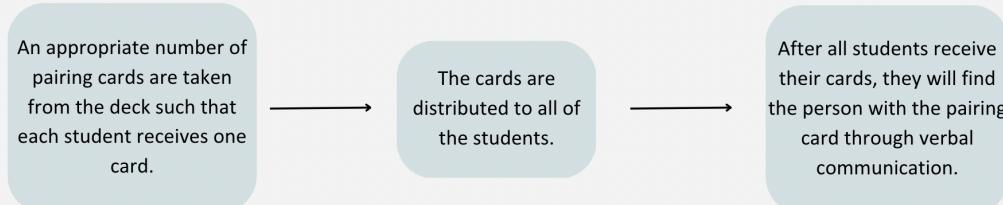
1. Cardboard for the box
2. Paper to stick on the sides of the box
3. Cardstock/chart paper for the cards.

Box Design Overview (refer to drawing on page 26):

- Top: Game name, age and the number of players, picture depicting the concept of the game
- Front and Back: Pattern related to the game
- Sides: Game name with patterns
- Back: Introduction to the game



Flow Chart:



Criterion C - Planning and Creating a Solution

Strand I - Construct a Logical Plan

Step	Task	Tools Required and Materials	Time	Quality Check
1	Make a list of card pairs - Type out around 40 different cards (20 matching pairs)	- Laptop	45 minutes	Ensure that all the cards have an obvious match by asking another person oblivious to the pairs to match them
2	Find a box for the game - Find a suitable sized box that would fit all the contents of the game.	N/A	10 minutes	Compare with dimensions in the planning to ensure that it is suitable.
3	Draw the design for the box - Cut the paper in the sizes of the sides of the box. - Draw/print the sides (include the name of the game, number of players, age rating, etc.)	- Pencil - Eraser - Pen/marker - Colored markers/pencils	1 hour	Before sticking the paper, place it on top to check whether the size and designs are suitable.
4	Stick the sides on the box. - Using the finished papers from step 8, stick them on their respective sides using strong glue.	- Glue - Box made - Papers made	15 minutes	Compare with the initial design idea to see if there are any improvements to be made.
5	Create a test card - Check if the initial dimensions and placement of the word and corresponding drawing are suitable.	- Paper - Scissors - Ruler - Pencil	10 minutes	Check if the dimensions and paper material are suitable. Place the card in the box to make sure it fits.
6	Cut out cards - If the test cards are suitable, cut out the rest of the cards following the same dimensions.	- Paper - Scissors - Ruler - Pencil	15 minutes	By stacking the cards, check if all of them are the same size. If not, trim them accordingly.
7	Write words on the cards - Using the list made, write them on the cards using a marker with clear, consistent handwriting.	- Pen/marker - List of words	20 minutes	Ensure that all the cards are easily readable. If not, remake them.
8	Outline the pictures on the card - Sketch corresponding drawings on the cards using a pencil. - Using a pen/marker, outline the sketched-out pictures to ensure that they are clear.	- Pencil - Eraser - Pen/marker	1 hour	Check all the cards to ensure that the size and style of the pictures are similar.

9	Color the pictures on the cards - Fill in the outlined drawings with color to make it more clear and help the game better appeal to young children.	- Colored pencils/markers	1 hour	Ensure that all the completed drawings correctly correspond to the words
10	Create game instructions. - Type the game instructions on a document. - Print the document. - Fold it and place it in the box along with the cards.	- Laptop - Printer - Box and cards	45 minutes	Read the instructions thoroughly to check if they make sense and would make sense to young children.
11	Work on final touches - Fix all minor flaws in the game, ensure that all the cards are there and that the product looks finished (cut off excess paper or cardboard in the cards or box)	- Pencil - Eraser - Pen/marker - Colored markers/pencils - Scissors - Glue	30 minutes	Carefully observe the product and compare with the initial idea.

Gantt Chart

Task	February							
	6	7	8	9	10	11	12	13
Make a list of cards								
Find a box for the game								
Draw the design for the box								
Stick the sides on the box								
Create a test card								
Cut out cards								
Write words on the cards								
Outline the pictures on the card								
Color the pictures on the cards								
Create game instructions								
Work on final touches								

Strand II - Demonstrate Technical Skills

Technical Skills

1. Planning skills:

While brainstorming for the various aspects of my product, I created tables and mindmaps depicting the details of the problem and potential solutions. Additionally, to ensure that the process of creating the product would go smoothly, I created a comprehensive action plan with tasks and deadlines.

Design

Complete Drawings

Print Designs

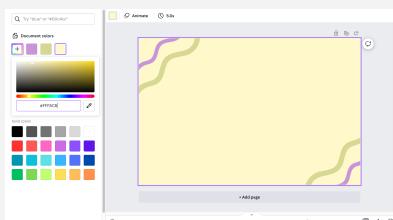
2. Research skills:

To ensure that I had all the required knowledge to go about creating my product, I conducted both primary and secondary resources. I created multiple questions that I wanted my research to answer to help me understand the problem and solution better. As a primary source, I asked my peers about their experiences with the fear of communicating at a young age at school. This gave me an insight into what specific problems I needed to address in my solution. As a secondary source, I conducted various web searches to find relevant statistics and information regarding the problem and existing solutions, which I thoroughly analyzed to determine their strengths and weaknesses.

3. Mathematics skills:

While determining the dimensions of my product and the number of cards I had to compromise between cost, flexibility and feasibility. To choose the number of cards, I took the average number of students in a classroom to determine how many pairs would be needed. I also added extra cards because there is a possibility of a classroom having a large number of students. However, I also had to consider the fact that if there were fewer students, cards would have to be removed. Furthermore, I created the sides of my boxes digitally and needed them to be printed in the correct size. For this to happen, I needed to ensure that the dimensions when printed would match. I measured the size of an A4 sheet I already had and the size of an A4 sheet on my laptop to determine the ratio between them. Using that ratio, I ensured that when the design was printed, the dimensions would be suitable.

Width	Height
1600	1200
px	px



4. Graphic design skills:

While creating the sides of my box, I used a graphic designing tool to ensure the maximum level of aesthetic appeal. Using the tool, I decided on various colors and patterns that I thought would be suitable for my product while making it stand out on a shelf. I selected appropriate

5. Drawing skills:

Although it would have been ideal to print the cards, I did not have access to a printer that could print on thick paper. Because of this, I drew the pictures on the cards by hand. This involved using my artistic abilities to ensure that the drawings were clear and aesthetically appealing.

6. Crafting skills:

Throughout the process of creating my product, I had to use my crafting abilities to help give the product a finished look. This involved cutting the cards, cutting the sides of the boxes and sticking the slides onto the box. I had to ensure that the cutting was smooth and in straight lines and that the sides of the box were stuck well to avoid any peeling.



Strand III - Follow the Plan to Create the Solution

Steps

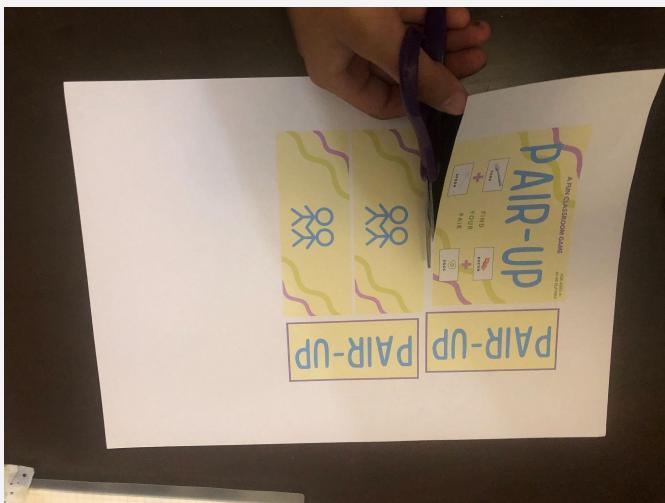
1. Make a list of cards:

1. Star, moon
2. Summer, winter
3. Bacon, eggs
4. Salt, pepper
5. Short, tall
6. Big, small
7. Pen, paper
8. Over, under
9. Sweet, sour
10. Soap, water
11. Arm, leg
12. Thick, thin
13. Fork, spoon
14. Milk, cookies
15. Peanut butter, jelly
16. Needle, thread
17. Give, take
18. Lost, found

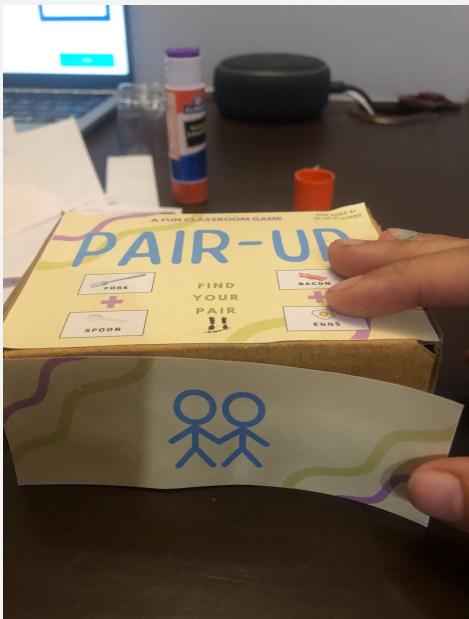
2. Draw the design for the box:



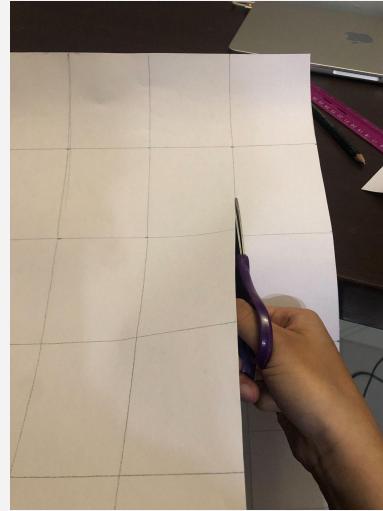
3. Stick the sides on the box:



4. Create a test card:



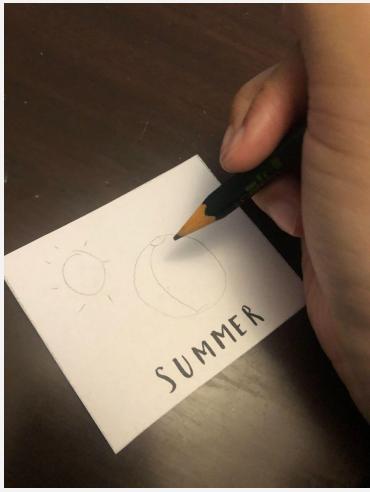
5. Cut out cards:



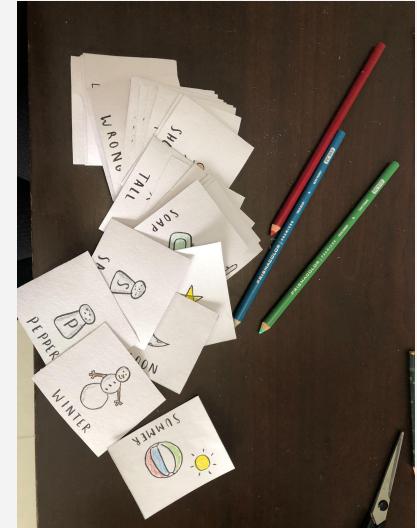
6. Write words on the cards:



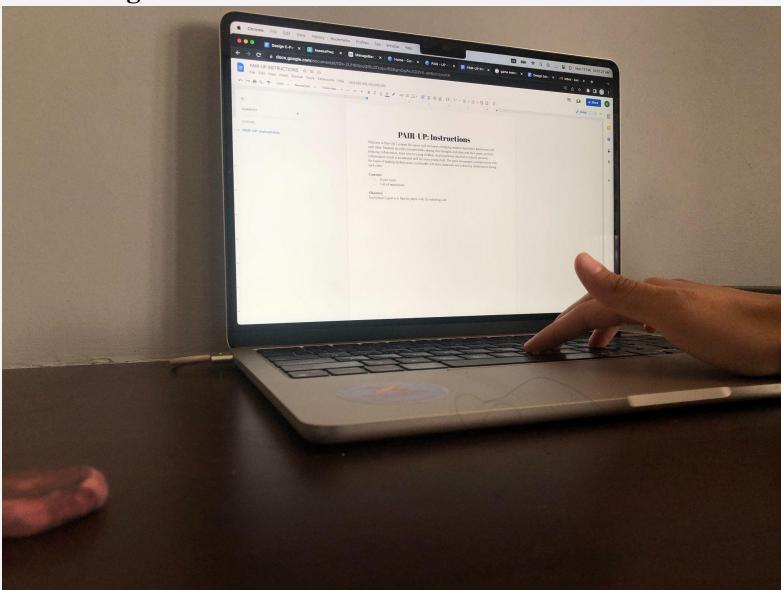
7. Outline the pictures on the card:



8. Color the pictures on the cards:



9. Create game instructions:



PAIR UP: Instructions

Welcome to Pair Up! This game was created with the hopes of helping students familiarize themselves with each other. Students are often uncomfortable sharing their thoughts and ideas with their peers, severely reducing collaboration. Most seen in young children, 'Schoolophobia' (the fear of school) prevents collaboration which is an essential skill for every young child. The game encourages communication and fun while the hopes of making students more comfortable with their classmates and enhancing collaboration are also met.

10 to 36 players
Ages 4 and up

Contents:

- 36 pair cards
- 1 set of instructions

Objective:

Each player's goal is to find the player with the matching card.

Setup:

1. Depending on the number of players, sort the cards such that each player gets a card with a pair (e.g. If there are 24 players, ensure that there are 12 matching pairs).
2. If there are an odd number of players, the teacher may take part in the game as well to ensure that every student has a pair.
3. Shuffle the cards thoroughly.
4. Distribute the cards so that each player gets one card.

Playing the Game:

1. Once all the cards are distributed, students will go around the classroom to find the person with the matching card.
2. The game will go on until all players have found their pair. Keep in mind that the matching words could be antonyms or even things closely associated with each other.
3. Once all players have found their pairs, the matching cards will be checked while referring to the answer key (back of the sheet).
4. All players who successfully found their pairs will be considered the winners!

10. Work on final touches:



Final Product:

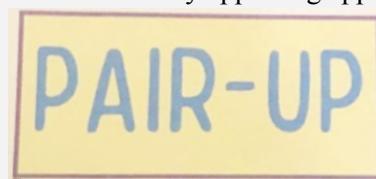


Demo Video: <https://shorturl.at/ahyGP>

Gantt Chart – Actual Timeline

Task	February							
	6	7	8	9	10	11	12	13
Make a list of cards								
Find a box for the game								
Draw the design for the box								
Stick the sides on the box								
Create a test card								
Cut out cards								
Write words on the cards								
Outline the pictures on the card								
Color the pictures on the cards								
Create game instructions								
Work on final touches								

Strand IV - Justifying the Changes Made to Chosen Design and Plan

Aspect Changed	Initial Plan	Final Plan	Justification
Box Design	To draw the sides of the box on pieces of paper and stick them on the box.	To create the sides of the box digitally, print them out and then stick them.	Printing the sides gave me more flexibility when it came to the colors. It also gave my box a more professional look.
Box Dimensions	The box dimensions would be 4.5 x 3 x 1.	The box dimensions are 4 x 3 x 1.5.	To avoid any environmental damage, I decided to reuse a box I already had. Fortunately, I was able to find one suitable for my product, but it did not follow the dimensions of my initial plan.
Card Dimensions	The card dimensions would be 4 x 2.5.	The card dimensions are 3 x 2.5.	Because of the change in the box dimensions, I had to revise the card dimensions accordingly to ensure that they fit in the box with extra space to make it easy to take them out. I initially created a test card with the dimensions 3.5 x 2.5, however, it did not fit in the box because I had not accounted for the thickness of the sides of the box.
The number of players	The game would accommodate up to 40 players.	The game accommodates up to 36 players.	While making the list of pairs, I could not find 20 suitable pairs because some pairs were too closely related to others which could cause misunderstanding or the pairs were uncommon and young children would be unable to associate them. However, I was able to find 18 suitable pairs.
Packaging	The cards would just be placed in the box.	The cards are in a cloth bag.	After finishing the product, I noticed that the cards were somewhat difficult to remove without flipping the box over. Most games put cards in a plastic covering to prevent this, however, with the environment in mind, I decided to use a cloth bag that had already been used before.
Instructions	The instructions would be a folded A4 sheet.	The instructions are smaller than an A4 sheet.	After printing out the instructions, I folded them to put in the box. However, it could not fit well without folding it more, but this would be too small. I decided to cut off the margins on the paper to ensure that it would fit correctly.
Box sides	The left and right sides of the box would contain the name of the game and patterns. 	The left and right sides of the box contain only the name of the game.	While digitally designing the sides of my box, I decided that adding patterns would make it look too cluttered. By only adding the name, it gave a more minimalistic and aesthetically appealing appearance. 

Criterion D - Evaluating

Strand I - Design Detailed and Relevant Testing Measures

Peer Feedback

To get an overall understanding of the quality of my product, I created a survey that I sent to my peers (form link in Appendix: Exhibit B). The results helped me gain a broad insight into the various aspects of my game (primarily aesthetics and perceived effectiveness) and helped me identify areas of improvement.

Primary Findings From Survey (refer to Appendix B, Exhibit A for survey results):

1. All respondents rated the aesthetics above 7 on a scale of 1-10.
2. All respondents rated the game an 8 or higher in terms of how well it addresses the issue.
3. 63% of respondents mentioned improving the quality of the cards.
4. Respondents mentioned that the concept was interesting and suitable for the target audience.

Field Trial

Because my product is a game, it is important that it works when in use. Conducting a field trial will give me insight into the overall gameplay, in terms of how easy it is to set up, the time it takes and how well it addresses the problem at hand. (Refer to Appendix: Exhibit C for evidence of the trial) During the trial, I will make note of my observations and then interview students to understand their experience with the game.

My Observations:

The children enjoyed the game, and even requested to play it again. Their enthusiasm was prominent throughout the game. However, there was a miscalculation in the number of pairs needed in the first round, and the pairs of some students' cards were not distributed. In the second round, this issue was resolved and all students had a pair. The students spoke with one another to a great extent and were able to feel a connection with the person they were paired with. However, sometimes, the person with the pairing card was extremely close at the start of the game and they were able to find their pair easily with minimal communication. Slight damage was observed in the cards.

Interview with students (7 year olds) (Refer to Appendix: Exhibit D for audio recording of interviews):

Interview 1 - Transcript:

Q: How enjoyable did you find the game?

A: It was very fun.

Q: Did you find the game too easy, too hard, or was it alright?

A: It was kind of hard to find my pair, kind of.

Q: Do you think it helped you collaborate or communicate with your friends?

A: Yes.

Interview 2 - Transcript:

Q: Did you find the game fun, did you enjoy it?

A: Yes, I enjoyed it.

Q: Do you think anything could have been improved.

A: Um, no. It was so good, I loved the game. I liked the game. Like it wasn't the best, I liked it.

Q: Did you find it too easy or too hard?

A: No it was just simple, I liked it.

Q: Do you think it helped you collaborate or communicate with your friends?

A: Yes, yes.

Summary:

Being second graders, the students did not give very detailed answers but I was able to gain insight into their perspectives of the game. From the interviews, I concluded that the game was suitable for their age group and helped them communicate with their peers.

Expert Appraisal

With my goal being to help young students feel more comfortable collaborating with one another, teachers would be the most experienced with the problem. This gives them a different perspective that will help me understand how successful my product is. After the field trial, I sent a questionnaire to the teacher who was present to help me evaluate my product (Refer to Appendix: Exhibit D for form link and responses). Below are the questions and the teacher's response to them.

Question	Answer from Ms. Sai Madhuri
How appropriate do you think the game was for the students?	The activity was extremely appropriate for Grade 2 students aged 7 - 8 years.
How well did the game help the students improve their communication and collaboration skills?	The students had to read out the words in their cards, analyze what goes with the word, and search for the classmate who has the relevant card. This engagement needed much communication among the students.
What is your overall feedback on the game; what was done well and what could be improved?	The engagement was very interesting and could be used to help students with many concepts across subjects. For improving collaboration skills, the engagement could include the partners depicting the pair using actions and their peers guessing what the pair is about. For example, a pair of students enacting spoon and fork and their peers guessing it.
On a scale of 1-10, how would you rate the game overall?	9

Self Appraisal (Destructive Testing)

For my game to be successful, it should be durable enough to withstand classroom conditions. To help me determine the quality of the physical aspect of my game, I will conduct destructive tests to ensure that the game is adequate.

Test and Method	Expected Outcome	Actual Outcome
Box Quality: - Open and close the box 30 times.	The box and the paper stuck on it should receive little to no damage. The box should open and close with ease.	There was minimal damage observed, however, the corners on the paper stuck on the box had somewhat peeled off. While opening the box, the instructions often got stuck to the lid of the box. 
Card Quality: - Shuffle the cards 4 times. - Slightly bend cards.	The cards should be easy to shuffle. They should not tear or fold while shuffling. While bending the cards, they should not develop creases.	The cards were somewhat easy to shuffle, however, the cards were naturally slightly bent, making it moderately difficult. While bending the cards, no creases were observed.

Overall Durability: <ul style="list-style-type: none"> - Drop the box (along with contents) from a height of 2.5 feet 4 times. - Put an object of 375g on top of the box. 	The box should not be damaged while dropping it (it should remain intact and still be functional). The contents of the box should not be affected in any way. The box should be able to withstand the weight with no damage.	While dropping the box, no changes were observed. All contents remained intact. The box was easily able to withstand the weight.	
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Strand II - Critically Evaluate the Success of the Solution Against the Design Specification

Element	Specification	Grading Scale	Justification
Aesthetics	The product should include bright colors to appeal effectively to young children. It should also stand out against other similar products in terms of aesthetics to those who are purchasing it.	9/10	The box is aesthetically pleasing, however, the aesthetics of the cards could be improved upon.
Cost	The product should be relatively cheap considering that teachers do not typically have high salaries and schools have a limited budget or other priorities. With this in mind, the product should not cost more than ₹600.	10/10	No money was spent on the creation of the product, all materials were found in my house and were inexpensive. The approximate price would be ₹100.
Customer	The target audience for the product is children aged 5-8, and those purchasing it are likely to be middle-aged adults who work with children. This means that the instructions of the game should be simple enough for a 5-8-year-old child to understand.	10/10	During the field trial, the children (aged 7-8) thoroughly enjoyed the game and did not find it too easy or difficult. Being the mean age range in my target audience, it is appropriate.
Environment	The product should be made mostly out of reused or eco-friendly items. Plastic content should be limited and the packaging should not be too bulky.	9/10	The box is reused and the product is plastic free, however, the cards are not made of recycled paper.
Size	The game should be big enough (have enough materials) to accommodate at least 20 people. The dimensions of the product should be such that it's easy to store in a classroom.	9/10	The product is able to accommodate a high number of players but not a low number. The size of the box is appropriate.
Safety	None of the game pieces should be a choking hazard to young children. There should be no sharp objects included and no electricity involved to avoid any accidents.	10/10	The game is safe in all ways. Neither the cards nor the box has any sharp corners or edges. None of the contents is a choking hazard.
Function	The game should involve some form of communication among the players while not putting pressure on players to speak on the spot. This should help the students feel more comfortable collaborating with one another. The game should be straightforward, easy to play, and fun. It should not take longer than an hour to complete. The game is also hands-on to increase its interactivity.	8/10	The product enhances communication but there is no direct correlation to collaboration. However, the communication in the game helps students familiarize themselves with each other and can therefore aid in any future collaboration.
Material	The game should primarily consist of materials like paper, cardboard, and wood to account for cards, the board (if there is one), packaging, and game pieces.	9/10	The materials match the specified ones, however, the cards could be made of a sturdier material.

Evaluation Against Success Criteria

Criteria	1-2	3-4	5-6	Score out of 6
Customer	<ul style="list-style-type: none"> - The game's rules are too complicated for young children to play. - The colors are not adjusted to the liking of young children (bland or dull) - The game is boring or confusing. - The game is not at all suitable for the target audience. 	<ul style="list-style-type: none"> - The game's rules are simple enough for young children to understand but could be more straightforward. - The colors are somewhat appealing to young children but could be more colorful. - The game is entertaining, but might be somewhat boring. - The game is appropriate for children aged 5-8, but more suitable for older or younger age groups. 	<ul style="list-style-type: none"> - The product has simple and straightforward rules. - It appeals to young children through its colors and overall aesthetics (shapes, fonts, etc.) - The game is entertaining enough so that children aged 5-8 do not get bored or confused. - The game is age-appropriate and does not contain any content that would be considered inappropriate, especially in a school environment. 	5
Function	<ul style="list-style-type: none"> - The game does not involve communication or teamwork. - The concept is boring or already exists. - There is no collaboration involved and students are unable to familiarize themselves with each other. - The game components are of poor quality 	<ul style="list-style-type: none"> - The game incorporates either communication or teamwork. - It has a unique concept, but similar products already exist. - The game objective allows some extent of collaboration. - The game components are of adequate quality. 	<ul style="list-style-type: none"> - The game encourages teamwork and communication. - The concept of the game is original and has humor to a certain extent. - It allows students to collaborate and get to know each other better. - The game components are of exceptional quality. 	5
Accessibility	<ul style="list-style-type: none"> - The price is over 700 INR. - Not all types of people are able to play the game because it doesn't account for those who are disabled either physically or mentally. 	<ul style="list-style-type: none"> - The price is not more than 700 INR. - The game is playable by all types of people (Doesn't include much physical movement because schools may have students who are physically disabled.) 	<ul style="list-style-type: none"> - The price is not more than 600 INR so it's affordable for teachers/schools. - The game is playable by all types of people (Doesn't include much physical movement because schools may have students who are physically/mentally disabled.) 	6
Aesthetics	<ul style="list-style-type: none"> - The game is not at all aesthetically pleasing, reducing the possibility of purchase. - The colors are either too vibrant or too dull. 	<ul style="list-style-type: none"> - The game's aesthetics make it somewhat appealing to buyers/customers. - Mostly bright and vibrant colors are used but are somewhat disturbing. 	<ul style="list-style-type: none"> - The game's aesthetics make it appealing to buyers/customers. - Bright and vibrant colors are used without making it too disturbing. 	6
Total	The final product should score at least 18/24 to be successful			22

My product scored a 22 out of 24, making it successful.

Summary of Testing Methods

Aspect Tested	Testing Methods	Expected Outcome	Actual Outcome
Gameplay	Field trial	The game should be easy to set up and should not be either too easy or too hard to play. It should take a decent amount of time for the game to finish without lasting longer than 20 minutes.	The game was somewhat difficult to set up because the cards needed to be paired up and the correct number of pairs needed to be taken. After this, the cards needed to be shuffled. The game was neither too easy nor too hard and took approximately 5 minutes to finish.
Aesthetics	Peer feedback	The game should be aesthetically pleasing and the drawings (and writing) will be clear. The box should have unique, bright colors without being too disturbing.	The game is aesthetically pleasing and the drawings (and writing) are clear. The box has unique, bright colors without being too disturbing.
Function	Field trial, Expert appraisal, Peer feedback	The game should effectively help students familiarize themselves with their peers and enhance future collaboration.	The game was able to help students communicate and develop connections with their peers in an effective manner, thereby enhancing future collaboration.
Durability	Field trial, Self appraisal	The product should not get easily damaged (both the box and cards).	The box received slight damage upon opening and closing it multiple times. During the field trial, some cards became slightly bent and torn.
Adherence to target audience	Field trial, Expert appraisal	The product should be suitable for the target audience in terms of the vocabulary involved and the concept of the game.	The students were well entertained by the game and did not face much struggle when finding their pair. A teacher determined the product as 'extremely appropriate for Grade 2 students aged 7 - 8 years'

Strand III - Explain How the Solution Could Be Improved

Area of Improvement	Improvement
Logistics	Because setting up the game was somewhat complicated, the number of cards could have been more appropriate and the concept of the game could have been improved to avoid any complications.
Durability/Material	The cards could have been made of a more sturdier material or laminated to prevent damage and help them last longer. The paper on the sides of the box could have been stuck with a stronger adhesive to improve the durability.

No other noticeable flaws in the product were observed as there were relatively positive outcomes from all testing methods, and the product effectively adhered to the requirements in the design specification.

Strand IV - Explain the Impact of the Solution on the Client

Problem:

Young students can have a difficult time adapting to their new surroundings which impairs their ability to collaborate with unfamiliar people, build effective relationships with their peers, and enhance their communication skills. In a survey conducted, majority of participants (aged 15-16) found it difficult as a younger student to collaborate out of the fear of being judged. Schools have a diverse set of students, making it extremely important that they are comfortable collaborating with each other. From personal experience, commonly used icebreaker games put unnecessary pressure on students, and ineffectively adapting to a student's surroundings can have a detrimental effect on their collaboration skills. Collaboration is an important part of a student's life as it prepares them to interact with people across the world and improve teamwork skills.



Solution and Impact:

To address the issue, I created a classroom game that intends to help students familiarize themselves with their peers, and make them more comfortable to collaborate. In the game, each student is given a card that has a pair (e.g. summer and winter). The student must find the person with the corresponding card. The game enables students to use their communication skills to determine what cards other students have to ultimately find their pair. Students will become more comfortable interacting with their peers, and therefore increase collaboration. My product, though intending to help students familiarize themselves with each other, deviates from traditional ice-breaker games. Traditionally, ice-breakers involve students sharing things about themselves which can put unnecessary pressure on them. This game is unique because it helps students communicate with each other without any pressure. Because schools include students from different areas across the world, the game increases globalization by increasing the interaction between people of different backgrounds.

After the creation of my product, and identifying the intended impact, I was able to design methods to test all aspects of the product. Of the testing methods, the field trial was the most relevant because I was able to gain an understanding of how the product performs. Through my observations, I noted the amount of verbal communication among students and the sense of connection they felt with their peers. This was clear from their behaviour and demonstrated the fact that my product achieved its goal. Apart from the function of the product, the aesthetic features, materials, environmental concerns, safety and cost were able to enhance my product's performance. The aesthetic features of my product were evaluated by my peers and received an overwhelmingly positive response. Additionally, the drawings on the cards were positively acknowledged by students during the field trial. To ensure that my product had a low cost and environmental impact, I tried to use things readily available to me. However, ensuring a low cost and low environmental impacts compromised the material and durability of the product. Nevertheless, my product was able to meet all the design brief, design specifications and success criteria to a great extent.

To summarize, the impact the product has on my target audience includes:

- Providing students with a fun and entertaining game
- Helping students improve communication skills
- Giving students a simple way for students to familiarize themselves with each other
- Helping students improve their ability to collaborate with others
- Providing the opportunity for students to get to know one another in a stress-free environment

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Appendix

Exhibit A: Survey to evaluate the problem and determine possible solutions

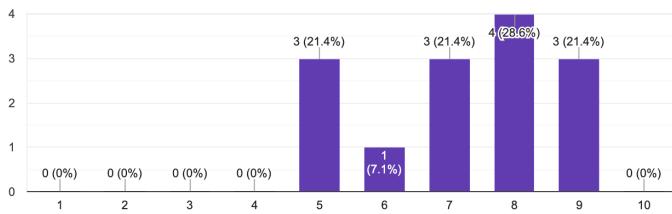
Google Form link: <https://forms.gle/SAwVjVKuPkhhypSs9>

Google Form responses:

To what extent were you afraid of sharing your thoughts and ideas with your peers when you first started school?

[Copy](#)

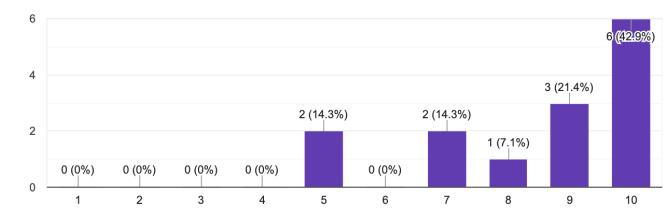
14 responses



To what extent do you think an ice-breaker of some sort would help students collaborate more effectively?

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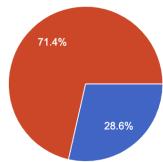
14 responses



What type of product do you think would best suit the situation?

[Copy](#)

14 responses



- Virtual product (such as an online ice-breaker game)
- Physical product (such as a board/card game that helps students get to know each other)

entertainment

Should help each other find some common interests, should be fun to do.

Interactive, adaptable to age, let's you share interesting information about yourself

A place to chat with other peers

A game of some kind

An interactive game because they will have a shorter attention span than older children

A game like "cards against humanity" online or physically would be beneficial

What features would you look for in a product aiming to help students get to know each other better?

13 responses

messaging and video calling

interesting and engaging

A well rounded activity database, that encompasses the improvement of student-student relationships.

Not too personal, Fun and short

Mini games involving teamwork and participation. Ex: taboo, 2 truths a lie

interactive and intriguing physical games

Something more than the typical ice-breakers

A space where thoughts can be said without the fear of judgement

an activity to do together in real life. something hands on

What products do you think would help young students (aged 5-8) collaborate more effectively?

12 responses

idk what would help lil kids tbh, sorry

A virtual product would prove more helpful.

Physical product such as board or card game

A team board game allowing multiple players

board games

Similar to Jenga or puzzles

A product that is very entertaining and engaging as mostly young students have a lower attention span.

building something

fun games that requires collaboration

Exhibit B: Peer evaluation survey to determine product success

Google Form Link: <https://forms.gle/CFMgF3z42JGpPJus5>

Google Forms Responses:

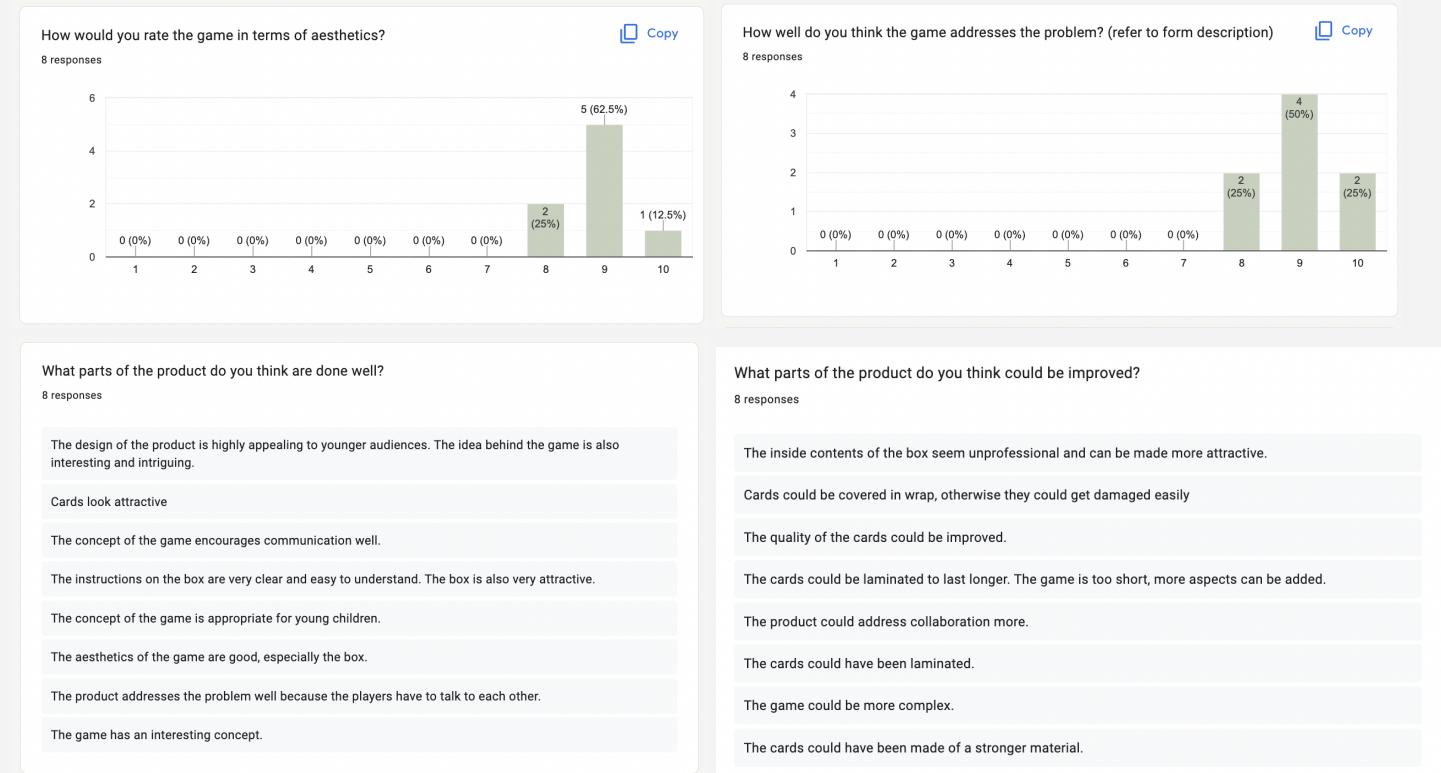


Exhibit C: Evidence of field trial

Picture:



Video of field trial (link): <https://drive.google.com/file/d/1Bu-XJz6aRSZgHFYc8kjGEygJ4k0NdFNv/view?usp=sharing>

Exhibit D: Interview with students who played the game

Interview Recording With Students:

<https://drive.google.com/file/d/1BJdqqNWfHajH4BtJzXEzzw8rm0hffAu6/view?usp=sharing>

Exhibit E: Questionnaire with the teacher present during the field trial

Evidence:

Game Feedback

To: Sai Madhuri

Dear ma'am,

Thank you so much for giving me the opportunity to test my game. As a teacher with a lot of experience with young children, I am sure you would have some feedback regarding the game. Here is the feedback form, please fill it out as it would help me with my project: <https://forms.gle/GpLjoQCtJVQT54rx9>. Thank you so much, ma'am, and do share the pictures from the class!

Teacher Feedback - Pair Up
forms.gle

[Reply](#) [Forward](#)

Google Form Link: <https://forms.gle/isEP29EEy8VkKvYd8>

Google Form Responses:

How appropriate do you think the game was for the students?

1 response

The activity was extremely appropriate for Grade 2 students aged 7 - 8 years.

How well did the game helped the students improve their communication and collaboration skills?

1 response

The students had to read out the words in their cards, analyze what goes with the word, and search for the classmate who has the relevant card. This engagement needed much communication among the students.

What is your overall feedback on the game; what was done well and what could be improved?

1 response

The engagement was very interesting and could be used to help students with many concepts across subjects. For improving collaboration skills, the engagement could include the partners depicting the pair using actions and their peers guessing what the pair is about. For example, a pair of students enacting spoon and fork and their peers guessing it.

On a scale of 1-10, how would you rate the game overall?

1 response

9