Disruptive Classroom Transition Times

Final Report

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Overview

The learning environment of a student can drastically change the level of education a student receives. It has been seen to directly affect how well a student can develop and grasp key concepts. When there are disruptive peers in a student's learning environment, this can result in a long-running impact on the child's education, and has been linked to decreased individual future success and prospects. Excessive student disruptions can also lead to increased teacher frustration and heightened stress. Depending on differing constraints within each school, dealing with disruptive peers can be an extremely difficult challenge for all stakeholders involved (Jay, 2016).

When school children are young, between the grades of prep to year 2, the time spent transitioning from one learning activity or break to another, called transition times, is commonly known to be when disruptions occur most. Although there are techniques and proven ways to maximise the chance for students to reduce disruptions, transition times for many children can be difficult, due to them struggling to settle in from outside breaktime to inside learning. Research also shows that disruptive student behaviour during classroom transition times causes many negative impacts including loss of quality teaching time, decreased student academic achievement and poor teacher retention.

Thus, this project's aim is to ensure every child receives the best quality education by reducing disruptions during classroom transition times and therefore improving the efficiency of learning processes. This will ensure that every student is given equal opportunity to take charge of their own learning, in a supportive, nurturing and empowering context.

The proposed digital smart-speaker solution, *CalmaPet: The Digital Classroom Pet,* will aim to reduce disruptive transition times by minimising classroom noise through an emotionally-responsive "pet", calming students and facilitating learning by increasing the efficiency and success of classroom transitions. This solution has been supported by teachers through thorough user testing and has the potential to significantly benefit learning

outcomes for students by supporting early primary-school teachers in managing challenging transitions.

This report will showcase the extensive research and detailed design processes that have been undertaken by Team 😡 throughout this semester-long project, including the team's research into the problem of disruptive classroom transition times, as well as an exploration into the existing technologies and current strategies that exist in schools today. Research and analysis into the key users and stakeholders will be discussed as well as the proposed *CalmaPet* conceptual model design. The team's in-depth user study approach to interviews and prototyping will also be described in the hopes of effectively informing the upcoming Build team regarding avenues of future work and prototype development.

1.0 Background

Extensive research into the identified problem space was conducted in order to better understand and investigate the chosen problem as well as potential solution spaces. Initial research focused on negative and problematic student behaviour and this was narrowed down to focus on the issue of verbally-disruptive school-student behaviour in classrooms and later, through feedback and user research findings, disruptive classroom transition times. Research and literature reviews aided in recognising specific inter-related issues as well as understanding how technology can create meaningful change. Specific research including current and known student behavioural and transition time issues, consequences of such behaviour to the education system, causes of disruptive behaviour during transition times as well as current management and intervention strategies were explored to gain a deeper understanding surrounding user behaviours and needs, in support of the proposal of a suitable digital solution, *CalmaPet.*

1.1 Problem Space

Disruptive and problematic classroom transition times and student behaviour is a significant challenge in schools across the nation and a testing environment for teachers, with poor classroom behaviour on the rise in recent years, especially in a post pandemic-world (University of Surrey, 2021). This presents a significant issue for the education sector, with nearly 45% of Australian students indicating *noise and disorder* in the classroom as a common norm (Programme for International Student Assessment (PISA), 2015). In particular, classrooms are facing increasing pressures in terms of disruptive classroom transition times, with research suggesting nearly 40% of a typical school day and valuable teaching time is lost, instead used for transitioning (Codding & Smyth, 2008). Verbally-disruptive and inappropriate student behaviours are more likely to occur during these transition times where students enter the classroom after being outside or on break (Campbell & Skinner, 2004), with a recent study suggesting Australia's school discipline presents as a "problematic situation", where levels of classroom disruption and noise are ranked as one of the highest, when compared to other OECD nations (Matthews, 2017). Disruptive student behaviour during transition times is leading to a plethora of interconnected issues including disrespect to teaching staff, increased learning difficulties for students, loss of quality educational instruction time, decreased academic achievement for students as well as rises in student disengagement and teacher frustration (IRIS Center, 2022). Some research suggests that approximately 80% of disruptive behaviour is a result of *poor classroom organisation, planning and teaching* (Parsonson, 2012). Now more than ever, Australian classrooms are in need of quality education and minimised student disruption, particularly during transition times. Students have the potential to learn, grow and develop positive and constructive

behavioural habits, and this is a critical dimension required for further consideration and exploration.

1.2 Focus Area

1.2.1 Disruptive Student Behaviour

What is Disruptive Behaviour?

There are many diverse behaviours that can be defined as disruptive. Most research considers disruptive behaviour, by learners in a classroom, to represent specific actions or behaviours that interfere with learning and teaching and can escalate if left unchecked (IUPUI Center for Teaching and Learning, 2022). These behaviours generally consist of one of three key dimensions: frequency, seriousness and context.

Cameron (1998) defines the five categories of disruptive behaviour, as follows:

1. *aggressive behaviour* (this can include displays of violence, pushing, hitting or demonstrations of abusive behaviour and language);
2. *physically disruptive behaviour* (this can include physical displays of anger, hitting, throwing, damaging surrounding objects);
3. *socially disruptive behaviour* (this can include social disruptions, shouting, yelling, temper tantrums, escaping the classroom);
4. *authority-challenging behaviour* (this can include answering-back, name-calling, defying teacher commands, refusing to cooperate);
5. *self-disruptive behaviour* (this can include not participating in learning activities, extreme day-dreaming, excessive use of devices).

In addition, some low-level disruptions are also described as disruptive behaviours, including *'talking out of turn'* and calling out in class (Watkins and Wagner, 2000).

Moreover, Beaman and Wheldall (2007) stated that *'talking out of turn'* is also the most frequently-displayed form of disruptive behaviour, compared with other serious, more high-level disruptions. They also found out that male students are more likely to exhibit disruptive behaviours, compared to their female counterparts.

As it can sometimes be difficult to explicitly define a 'disruptive behaviour', some teachers have remarked, *'Why don't we just agree on what behaviours are difficult and what we'll do to deal with them'* (Watkins & Wagner, 2000). Therefore, instead of defining a single meaning of disruptive behaviour, there are several key characteristics that can be considered, as described by Watkins and Wagner (2000):

- According to place: Yelling in the playground may be appropriate, however in the classroom, it is inappropriate
- According to audience: Comment to a person directly/indirectly may be different

- According to the actor: Different students doing the same thing may be treated differently
- According to the observer: Different observers may have different opinions on the same thing
- According to who is seen as harmed: Playing jokes on friends / Playing jokes on disabled classmates
- According to time: Talking during a lesson may be treated differently, depending on whether the teacher is happy/unhappy

1.2.2 Consequences of Disruptive Behaviour

Why is it a Problem?

Disruptive behaviour in classrooms is a problematic issue as it has the potential to negatively impact all who are involved in the classroom, and the general teaching and environment of the classroom. It has implications on students, teachers, and potentially the school as a whole. On a student level, misbehaviour can have negative effects on achievement and learning (Clunies-Ross et al., 2008), including both toward those who engage in disruptive behaviour and toward their student peers. On a teacher level, disruptive behaviour can affect teachers' well-being (Clunies-Ross et al., 2008). Behaviours which cause disruption often distracts the teacher, which can prevent them from teaching, and the students from learning (Swinson, 2010 as cited in Dursley & Betts, 2015). Further, it can even have greater consequences on the entire school.

Consequences on the Student

Poor academic achievement has long often been a consequence associated with disruptive behaviour (Johnson et al., 2005). Even from early childhood education, young children who exhibit and engage in disruptive classroom behaviours are at risk of having various academic problems throughout their school progression (Watson et al., 2016). They are also at risk for having behavioural problems as they continue during their schooling years (Watson et al., 2016; Miller, n.d.).

Further details regarding the consequences of disruptive behaviours on students engaging in the behaviour can be found in Appendix 10.9. In response to feedback, the focus has narrowed down to the issue of *disruptive behaviour* in regards to *classroom transition times*. Initial research addressed in Appendix 10.9 is less applicable, pertaining more to general disruptive behaviour throughout classes and therefore was removed. Likewise, for student peers and teachers, further information of the consequences of disruptive behaviour throughout class can be found in Appendix 10.9.

Consequences on Student Peers

A child engaging in disruptive behaviour can also affect the entire class, as their misbehaviour can lead to a decrease in learning time (Little, 2003 as cited in Clunies-Ross et

al., 2008), which can then have a detrimental effect on students' learning (Watson et al., 2016). Disruptive behaviours in school show to be a notable stressor for students (Nash et al., 2016). When one or more students behave in a manner that is disruptive, the learning process for their classmates becomes affected as they may be forced to have to wait for such behaviours to be addressed by the teacher (Miller, n.d.). The significant effects of peer influence may also encourage other students to engage in similar disruptive behaviours that they may not have otherwise engaged in (Miller, n.d.).

Consequences on Teachers

Disruptive behaviours can also have negative consequences on teachers. Managing students' behaviour in the classroom effectively is a continued universal challenge for teachers, with students' disruptive behaviours being "one of the greatest daily stressors" that school teachers experience (Nash et al., 2016). Research has shown that often, it is behaviours which are relatively minor yet frequently occurring which cause the most concern to teachers (Clunies-Ross et al., 2008). Amidst the other sources of stress that teachers must deal with, the cumulative effects of students' misbehaviours can lead to burnout and stress for teachers (Clunies-Ross et al., 2008). Behaviours such as this have poor effects not just on teachers' wellbeing, but also on their teaching.

Consequences on Teaching

Students' disruptive behaviour also has negative consequences on the teaching process, which becomes interfered (Miller, n.d.). Not only can disruptive behaviours distract students, but the reactions teachers must then give such behaviours often distract students who are trying to undertake academic tasks (Watson et al., 2016). Disruptive behaviours may potentially require a large portion of the teacher's attention and time to address the poor behaviour (Miller, n.d.). This takes away valuable time from the rest of the class in receiving instruction (Miller, n.d.). If teachers must spend a significant amount of class time trying to maintain order and ensure appropriate classroom behaviour, it will lead to 'time-off-task', which can lead to poorer student results (Backstrom, 2021). As described previously, disruptive behaviours may also influence others to engage in such behaviours (Miller, n.d.). This has the potential to compromise the teacher's ability to control the group and maintain authority over the situation (Miller, n.d.) which could lead to more serious implications.

Consequences on the School

The school as a whole has the potential to be affected negatively by students' disruptive behaviours. Dealing with disruptive behaviours may take away time and resources from the school which could otherwise be used elsewhere to improve the educational environment for all school students (Miller, n.d.). More in relation to extreme cases of disruptive behaviours, teachers are often unequipped to deal with such (Miller, n.d.). This may then result in the student having to be sent out of class or professionals being enlisted to aid and try to

intervene (Miller, n.d.). Such would take resources and funding which can have an impact on the whole school (Miller, n.d.).

1.2.3 Causes of Disruptive Behaviour

There are many causes of disruptive behaviour during classroom transition times, as outlined below. Further details regarding the causes of disruptive student behaviour can be found in Appendix 10.14. In response to feedback, the project's focus area has narrowed down to the issue of *disruptive behaviour* in regards to *classroom transition times*.

Home and Family Environment

A difficult home environment can be linked to increased negative and disruptive student behaviour during transition times (Vereen, 2020). Children experiencing stressful, traumatic and overwhelming issues at home, including poor parenting, family issues and a chaotic personal environment characterised by disorderly living routines, overcrowding and noisy living spaces, can lead to heightened stress and increased restlessness and poorer language choices in the classroom, especially during transition times (Jaffee et al., 2012).

Learning Difficulties

Learning difficulties and intellectual disorders are closely linked to classroom disruption, which can be heightened during transition times. Students with various learning and communication challenges, including those with dyslexia, speech and language issues, may find it difficult to engage with curriculum content and be struggling to understand theoretical material and teacher instructions. This can, in turn, lead to students misbehaving or disrupting the rest of the class, including exhibiting avoidance, aggression, social isolation as well as strong emotional outbursts, particularly after disruptive times of the day when students have re-entered the classroom after being active outside (Gaddad, 2014).

Sensory, Health and Behavioural Issues

A range of sensory, health and behavioural issues can also cause classroom disruptions (Child Mind Institute, 2021). This includes students with special needs, Autism, ADHD, anxiety issues as well as other psychological challenges and sensory disabilities which limit how children perceive the world around them and can cause increased confusion, miscommunication and difficulty responding to school requirements (Higgins, 2020).

Boredom

Student disengagement and disruption can also be associated with students experiencing feelings of boredom and disinterest in class content and transition activities. This may particularly be due to gifted students not feeling challenged-enough with class content or finding lessons too easy. This can lead to some students feeling frustrated and unmotivated during class (Livingstone, 2015).

Learned Behaviour and Lack of Routine

Children can also develop and mimic negative learned behaviours and patterns from friends, peers, family members and media influences, including abusive verbal language, answering-back, teasing and other forms of immoral behaviour (Rymanowicz, 2015). This can lead to students perceiving these behaviours as normal and acceptable practices to display in the school classroom, leading to other students potentially also developing such negative habits (The Royal Children's Hospital Melbourne, 2018). In addition, a lack of basic care and routine in a student's personal life due to a poor diet or sleep routine, can also lead to increased disruptive behaviour at school, especially in terms of struggles with fatigue, hunger and restlessness, contributing to more challenging transition times (Higgins, 2020).

Classroom Environment

The school and physical classroom environment can play an important role in influencing the level of student disruption, particularly during transition times (Obaki, 2017). Excessive classroom noise, sensory disruption, lighting issues as well as uncomfortable classroom temperature and seating can distract students and cause them to make more noise and misbehave as they enter the classroom. Disorganisation in the classroom and a lack of order can increase the likelihood of students becoming restless, excessively moving around and ignoring teacher remarks (Guardino & Fullerton, 2010). A classroom's seating arrangement as well as the number of students in a class can also determine whether or not disruptions will be an increased distraction (Unlu, 2017).

1.2.4 Classroom Transition Times

Based on the feedback received from the project proposal as well as interviews (see Section 4.1), we considered refining our project space from general disruptive behaviour in the classroom to disruptive behaviour during transition times. By making this change, a more specific solution could be devised which directly targets making transition times a more positive and efficient process. Also, this eases the difficulty of distinguishing between verbal disruptive behaviour and aloud classroom discussions.

What are Transition Times in the Classroom?

Transition times in the classroom are the short time periods in between learning activities when students are typically transitioning from one activity or location to another. Stacho (2013) describes some examples of transition times to include:

- Entering and leaving the classroom for beginning and end of day
- Entering and leaving the classroom for lunch breaks
- Changing seating arrangement for group activity
- Switching subjects or activities during class time

Transition times typically range from 10-15 minutes, however, if completed inefficiently, students abuse the opportunity to behave disruptively, prolonging the transition time (Stacho, 2013).

Disruptive Behaviour During Transition Times

Studies show that disruptive behaviour occurs more often during transition times than regular classroom times. A study conducted by Arlin (1979), which monitored on-task and off-task behaviours during transition and non-transition times in multiple classrooms over a 2 year period, concluded that the off-task, or disruptive behaviour during transition time was almost twice that of non-transition times. Arlin (1979) hypothesised that the increase of disruptive behaviour during transition times is related to the lack of momentum and smoothness inspired by the changeover. Reliable and continuous transitions result in a more ordered classroom with a smaller allowance for disruptive behaviour to occur (Finley, 2017).

Impact on Learning

From teachers, when requesting for assistance, the single most frequent desire is classroom management for behaviour, especially during “painful” transition times (Rose & Gallup, 2005). This causes a continuous cycle, where a stressed-out teacher negatively impacts their students which, in turn, causes more problematic students to arise (IBCCES, 2020). According to a study by Ergin & Bakkaloglu (2019), teachers, within two hours of an average day, will spend 35.09% of that time transitioning. Additionally, Finley (2017) stated “If you save 15 minutes a day through more efficient transitions, that will result in 45 extra hours of instructional time per year.” By minimising disruptive behaviour during transition times, the time it takes to transition consequently decreases. Research suggests that planning transition times in advance and following a structured sequence of tasks lowers disruptive behaviour (Finley, 2017; Ergin & Bakkaloglu, 2019).

1.3 Solution Space

1.3.1 Reducing Disruptive Student Behaviour

Numerous classroom behaviour management strategies have been implemented by teachers and educational institutions in schools across the nation. These management techniques focus on minimising, preventing as well as dealing with disruptive behavioural patterns in school children and range from simple classroom teaching strategies to more complicated learning frameworks that target student behaviour and assist in reversing key negative student behaviours in order to foster positive behavioural change (Arbuckle & Little, 2004). Refer to Appendix 10.15 for further detail.

Behavioural Systems and Classroom Rules

Various school and classroom-wide behavioural techniques and rules are implemented to prevent and deal with disruptive student behaviour. These strategies focus on highlighting negative behaviour and punishing students who regularly misbehave. Classroom rules and codes of conduct further reinforce to students the correct ways to behave in simple and positive terms. Furthermore, classroom rewards and incentives for students that behave in a positive manner are commonly used to attract pleasant student behaviour. These strategies are simple and direct and focus on individual student actions through disciplinary means (NSW Government, 2021).

Positive Classroom Discipline

Positive discipline is fast becoming a leading form of classroom behaviour management and education (Nelsen, 2022). It consists of guiding children to understand acceptable forms of behaviour through gentle and nurturing commands, less so focussed on negative behaviour and more focussed towards highlighting positive actions (Yussif, 2021). This has been found to be highly effective in assisting students to develop and maintain positive behaviour in classrooms through positive reinforcement, redirection strategies and encouragement. One such example currently used is *Positive Behaviour for Learning (PBL),* a framework used in schools across the nation, aimed at encouraging positive behaviour and developing safe and secure classroom environments (Queensland Government, 2020).

Moral Education

Moral and values-based education is a powerful tool used in some schools to develop positive qualities in students (Ryan, 2022). It focuses on educating values and beliefs to students, particularly surrounding actions that are right and wrong (Halstead, 2010). This helps to demonstrate to students what behaviours and characters, or morals, are acceptable and needed in a classroom or societal setting (Trivedi-Bateman, 2020). One example of a specific strategy implemented is *The Virtues Project*, a global framework and initiative used to inspire and cultivate character and good qualities or “virtues” in everyday life and in the classroom, such as kindness, patience, love and unity (The Virtues Project, 2022). This supports students to see their potential as limitless and be encouraged to develop strong values to help their friends, teachers as well as the wider world around them.

Noise Management

Another strategy of significance in managing student disruption is noise management. This is crucial in helping to calm and stabilise the classroom environment and minimise distraction to the learning at hand. Reducing noise in the classroom is highly beneficial in helping to increase the quality of teaching for students and reducing teacher frustration (Parsonson, 2012). Several examples of managing and reducing classroom noise have been successful in enhancing learning effectiveness. This includes a study conducted to control the intensity of noise in a classroom, where a device tracking the classroom’s level of sound was used to output students’ favourite music when levels of sound were acceptable. If the classroom’s

noise exceeded desirable levels, the music would consequently stop playing (Wilson & Hopkins, 1973).

1.3.2 Reducing Disruptive Transition Times

Teachers use several strategies to reduce disruptive behaviours during transition times and encourage students to settle down and prepare for the learning sessions to come.

Direct Instruction

According to a study by Mercer & Mercer (1993), for young children, teachers can teach students through direct instruction during transition time, including by directly demonstrating to students how to sit down and get out their learning materials.

Organisation

Lenz (1982) stated that teachers can also use advanced organisers to detail a list of activities that will be done in the next lesson, including materials, routines, expectations, background information and tasks, aiding students to feel more prepared for the upcoming learning session.

Physical Cues and Movement

Buck (1999) suggested using a physical cue, such as raising arms and saying ‘class is now starting’ to signify the beginning of a new lesson. Students may forget it is inappropriate to talk during a new lesson and thus, in this way, physical cues can be beneficial. Certain movements are used to help students remember rules and expectations change across different situations. Furthermore, signalling transition time has begun through activities including music, switching the lights on or off, singing a song and asking the students for their attention are other beneficial strategies that assist teachers to maintain classroom engagement and minimise excessive disruptions (Stacho, 2013).

Visual Timer

A visual timer can be helpful for students to ‘see’ how much time remains before the next activity. Time concepts are abstract (e.g., ‘a few minutes’), difficult to understand literally (e.g., ‘just a second’ or ‘in a minute’), especially if time-telling is not a learned ability. Visually presenting information about time can help to make concepts more understandable. According to research, using a visual timer helped students with autism effectively transition from computer time to work time at various intervals throughout the day (Dettmer, Simpson, Myles, & Ganz, 2000). This timer has a red portion that indicates the amount of time left. As the time limit expires, the red part vanishes.

1.4 Current Technologies

1.4.1 Noise Reduction Technologies

Technologies to help reduce and manage noise disruptions in classrooms and during transition times, are highly beneficial in enhancing the student learning experience and reducing disruptions (ASHA, 2022). These technologies integrate effective behavioural management principles, as discussed in Section 1.3, to support students to manage and reduce their classroom disruptions. Refer to Section 1.2 for related background research.

Yacker Tracker

One such device used to manage noise is the *Yacker Tracker (*https://yackertracker.com/). This device consists of a traffic light display that monitors the sound and decibel levels of a classroom, signalling green if sound levels are satisfactory, yellow if sound levels are increasing and a little over, and red if the noise in the classroom is too high (Yacker Tracker, 2022). This device helps students to become aware and work towards reducing and controlling noise disruptions. Some limitations of the device include that it does not integrate seamlessly with the entire classroom and only displays noise levels through a visual light and colour display. Incentivising the experience may also work to improve regulation. This may only be partially effective in managing noise disruptions, and other forms of output including audio may more effectively complement the interactions of this solution.

Bouncy Balls

Another technology for managing noise is a website called *Bouncy Balls* (https://bouncyballs). This website acts as a tool to measure noise, such as in the classroom, and requires the use of a microphone (Common Sense Education, 2022). According to the level of sound detected, balls on the screen will move erratically, increasing in movement when there is an increase in sound, and settling as sound levels decrease (Common Sense Education, 2022). Users can also choose to have bubbles, emojis or eyeballs as the visual theme instead of balls (Common Sense Education, 2022). There is also an ability to adjust the microphone sensitivity to fit the needs of the classroom environment, as well as setting a noise alert (Common Sense Education, 2022). This website can be a good tool for setting a baseline noise level and encouraging students to self-regulate their behaviour (Common Sense Education, 2022). However, there is also the limitation of the tool being counterproductive. Students may abuse the tool and purposely create noise just to see the balls move chaotically on the screen (Common Sense Education, 2022). This could create further distraction and disruption to the class than the original noise disruptions made by a student (or students).

Calm Counter

Likewise, another website for managing and monitoring classroom noise is *Calm Counter* (https://calmcounter.ictgames.com/). This displays a gauge and an arrow which will show

when noise levels are too high (Tech Crazy Teacher, 2017). There are green, yellow and red sections of the gauge, with the arrow starting in green but moving through yellow then red as sound grows louder (Tech Crazy Teacher, 2017). *Calm Counter* could be a helpful tool to visually show students their noise levels in a simple manner, and encourage self-regulation of students' noisy behaviour. Nevertheless, there is nothing integrated to try and mitigate such loud noises that students exhibit if they do. The tool merely acts as an indicator of noise levels, but will not do anything in and of itself to facilitate change in students' behaviours. Thus, the tool can easily be ineffective, especially if students aren't motivated to lower their noise levels by simply seeing the arrow on the gauge go towards the red section. Hence, this can be a limiting factor to this tool. A teacher or supervisor would have to devise their own method to settle students' high noise levels if such were to occur and students didn't self-regulate.

1.4.2 Smart Speakers

Artificial Intelligence (AI) is something which has become more and more prevalent in homes and classrooms (Moldovan, 2019), with AI being implemented into many of today's modern technologies. Smart speakers are one such example, often being a digital assistant to its users. With schools utilising more AI, using smart speakers in the context of a classroom environment has good potential, as it could allow teachers to focus on the teaching and interactions with the class, whilst the digital assistant could handle more of the routine work (Moldovan, 2019). Some existing smart speakers which have features that can be helpful in the classroom include the *Amazon Echo*, *Google Home*, and *Apple HomePod*.

Amazon Echo

The *Amazon Echo* is a smart speaker which teachers could utilise in the classroom if they desire to use such technology. It is powered by the digital assistant Alexa, which can answer students' questions or set classroom activity reminders (Moldovan, 2019). There are variations of the *Amazon Echo* which exist, including the *Amazon Echo Dot Kids Edition* (Moldovan, 2019). This kids edition in particular is targeted for a younger audience, with features such as parental controls, media with child friendly content, and a "positive reinforcement feature" so children can practise good manners when interacting with the device (Moldovan, 2019). Its advanced AI, voice recognition, and access to content, including apps specifically for classroom usage, "makes it the most popular digital assistant in the classroom" (Moldovan, 2019). However, for the context of helping manage disruptive behaviours, such as verbal disruptions, it may not necessarily be the most effective tool. The device implements a broad range of features meant for broad usability, which can be a limiting factor. Though it could be used in a classroom, it was not designed specifically for one, nor was it designed specifically towards dealing with this particular problem and use case. Thus, it is unlikely to have the features, functionalities and capabilities which may be necessary for helping deal with disruptive behaviours in classrooms, as it was not designed with this particular issue in mind.

Google Home

Another smart speaker is the *Google Home*. This has Google Assistant which can do various things such as answer questions and check spelling, amidst other functionalities (Moldovan, 2019). It also has ‘actions’, which is a feature which can be helpful if used in the classroom (Moldovan, 2019). For instance, using the actions feature, you can create flash cards (Moldovan, 2019). Users can also create their own actions (Moldovan, 2019). An apparent limitation of the device itself is that its speaker system is not powerful, which may pose an inconvenience for use in a classroom (Moldovan, 2019). Likewise as discussed regarding the *Amazon Echo*, it may not be an effective tool for specifically dealing with the problem of student disruptive behaviours in the classroom. Despite having features which may be helpful for classroom use, it is unlikely to have the features to specifically deal with the stated problem domain, as it was not designed for solving this problem in particular.

Apple HomePod

The *Apple HomePod* is another smart speaker, and in particular, it may be advantageous for music teachers because of its good sound system (Moldovan, 2019). It can be used to search for music using services like Apple Music, Spotify and YouTube (Moldovan, 2019). It is also a good option for teachers who plan to use products from Apple, as it can allow for a more seamless integration (Moldovan, 2019). Similarly to the *Amazon Echo* and *Google Home*, for the context of use in monitoring and managing student disruptive behaviour, it may not be effective as it is not targeted towards mitigating that issue.

1.5 Considerations for Solution Features

It was expressed in feedback that we consider what would be the best way to inform students that they are too noisy, and thus what outputs the concept solution should have. This prompted research into potential solution features. Some features which have been taken into consideration are visuals, music, and expressing/displaying emotions. These features build off previous research into the solution space, as examined in Sections 1.3, 1.4.

1.5.1 Incorporating Visuals

Due to the influence of technology, students’ viewpoint and mentality towards education and learning has shifted over time, with students expecting new forms of learning and teaching aids from their teachers (Cultus, 2018). As a result, more traditional methods used in the classroom may not be as effective, and requires the need for new and innovative materials to attract students’ attention and help them to concentrate (Cultus, 2018). Technology and its visual elements have attracted students more and more, and thus should be taken into consideration in a learning context to attract students (Cultus, 2018), such as for a digital technology seeking to prevent disruptive classroom transition times. According to research,

over 90% of educational institutions use technology with audio-visual aids to help establish good rapport with students and make classrooms more active (Cultus, 2018).

Incorporating the use of visual information and content in the classroom can be very beneficial for students, due to its engaging nature. Visual information is retained in long-term memory, is processed more efficiently than textual information, and triggers a stronger and faster reaction than words (SHIFT eLearning, n.d.). Especially for younger children, using visual content in learning is important. In a study by Evans and Saint-Aubin (2005), it was found that young preschool children fixate on illustrations during storybook reading, with there being minimal exploration of the text. For young children, colourful visuals are essential for engaging their attention (McKeown, 2022). Kids are also likely to follow directions better when there are visuals included (Nikolaeva, 2017). Thus, incorporating visual elements into a digital solution should be taken greatly into consideration.

1.5.2 Utilising Music

Using music may be a helpful and effective feature to incorporate into a solution for disruptive classroom transition times. Music can be an excellent way to signal to students when it is time to start after a break or for any other transition time in the classroom (DiDomenico, 2017). DiDomenico (2017) conducted a study with twenty-five teachers who responded regarding their use of music for the purpose of management and cohesiveness in the classroom. Of the respondents, seven teachers had expressed how they used music on a daily basis, whilst 4 use it ‘quite often’ and 10 use it ‘sometimes’ (DiDomenico, 2017). Some of their relevant responses include:

- “I use it as a transition piece in the classroom. The students know that the song is their cue to get cleaned up and back to their seats or on the rug.”
- “I use drums, whistles, wind chimes, and Zen chimes as attention getters. The students really respond to this.”
- “I use music to help establish routines with my students.”

(DiDomenico, 2017).

1.5.3 Expressing/Displaying Emotions

Including an emotional component that is evoked, such as through some person or character, as a result of students’ disruptive behaviour in class during transition times could be taken into consideration. Studies have shown that children who are as young as 6 years of age can recognise facial expressions of happiness, anger and sadness (Lawrence, Campbell & Skuse, 2016). These emotions are some out of several emotions which are expressed in our faces in similar ways all around the world (Lawrence, Campbell & Skuse, 2016). Having the skill of recognising different emotions is very important as it enables one to know how to respond appropriately in social situations, including how to respond to teachers (Lawrence,

Campbell & Skuse, 2016). Hence, it could be beneficial to incorporate personality and facial expressions of simple, common emotions into a proposed solution for disruptive classroom transition times. Students could learn the appropriate way to respond during transition times as a result of the emotion presented to them.

2.0 Stakeholders

Transitions are a difficult period for many children, where they can feel overwhelmed and demonstrate challenging and disruptive behaviours. Challenging behaviours as a result of transitions have an effect on the child, their teacher as well as the child's parents. As disruptive behaviours from transition times are more commonly found in younger children, we have chosen our target audience to be students in early primary school. The specific age group of school students that will be considered as part of the target user group for this proposal project, will include students in Prep to Year 2, comprising students between the ages of five to seven. This subgroup has been selected, as children in this age bracket are more receptive to reducing and altering challenging behaviours (see Section 1 Research) and exhibit higher occurrences of classroom noise disruptions (see Section 4.1 Studies). Table 1 describes each stakeholder group and how we considered them in regards to the design of our solution.

2.1 Stakeholder Summary

Table 1: Summary of stakeholder groups

Stakeholders	**Design Considerations and Choices**
Primary School Students (Section 2.2)	• The solution will be able to monitor noise levels • The solution will effectively notify students when they are moving from one activity to another
Teachers (Section 2.3)	• The solution has to provide meaningful teaching aid, so the teacher can focus on there lesson
Schools and Educational Institutions (Section 2.4)	• The solution needs to be cheap and integratable into prep to grade 2 class rooms • The solution could incorporate some aspects of the curriculum when design the transition activities
Parents and Caregivers (Section 2.5)	• The solution should to consider both positive and negative impacts on the students home life

2.2 Early Primary School Students

The target use case for this solution will consist of early primary school students and teachers in Prep, Year 1 and Year 2 classrooms. At this early primary school age, students are often curious and are learning and understanding different behaviours, such as classroom manners and the difference between good and bad choices. Being at this young age, it is vital that the student can trust the teacher, thereby avoiding a potential negative scenario, as illustrated in the user personas (see *Figures 1* and *2*). Although using personas

is a great method of capturing the user requirements, it is important to acknowledge that personas cannot capture every case of primary school students, as there are many different reasons that cause a student to be disruptive, such as their upbringing and family environment (see Section 1.2.3).

Transitioning from one activity to another, for some students, can be quite difficult and result in distracting and disruptive behaviours. These can be due to frustrations, provoked by anxiety and many other reasons (see Section 1.2.3). Due to this, it is crucial to ensure students feel comfortable and aware of their actions so that challenging behaviours can be reduced. These scenarios have been displayed below in the user personas (see *Figures 1* and *2*). For students to have the best possible chance of reducing disruptive behaviours during transition times, the solution will prepare the student through visual aids and effective transition activities, or "*movement breaks"*.

2.2.1 Persona 1: Jimmy

Figure 1: Persona of Jimmy, a student in Prep

When designing for Jimmy (see *Figure 1*), it is important to make sure to be able to communicate to Jimmy that it is time to transition from outside breaktime to inside learning, and to help him calm down and begin using his inside voice once again.

2.2.2 Persona 2: Leah

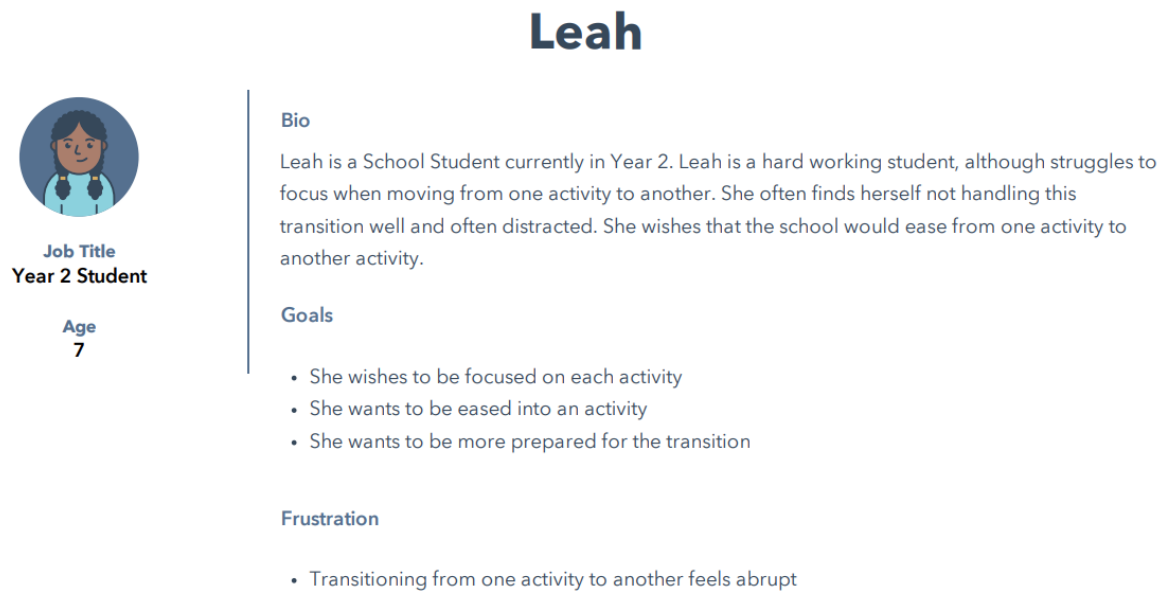


Figure 2: Persona of Leah, a student in Year 2

Some students (see *Figure 2*) struggle to learn in environments that are too loud. The proposed solution will have to be able to monitor the level of noise in the classroom to ensure all students are comfortable and focussed when coming back from noisy lunch breaks.

2.3 Teachers

Teachers are significant stakeholders in this problem and solution space, forming the crucial educators, leaders and carers of the target group of prep to year 2 school students. Teachers desire the best in terms of student achievement, growth and development, and are invested in every child's success. Thus, all stakeholders desire for students to develop positive behaviours and are in favour of reducing disruptions during time-consuming transition times. The proposed solution, will hence, be heavily supported if found to be effective and conducive to the learning and growth of individual students as well as to the productivity and efficiency of the collective classroom environment.

Teachers will be most involved and impacted by this problem and solution space (see Section 1.2.2: *Consequences on Teachers*). The proposed solution will be designed to form a tool that will aid in preventing the teacher from having to attend to disturbances during transition times, thus being able to focus on preparing for teaching and attending to other important matters. Disruptive classroom transition times can also add stress to the teacher, which has been shown to decrease the teacher's ability to teach and prepare quality learning

materials (see Section 1.2.4: *Impact on Learning*). Teachers should be able to seamlessly use the solution during transition times, so they can effectively prepare students for the upcoming learning session and minimise disruptions and, in turn, maximise the students' learning capabilities within the classroom.

2.3.1 Persona 3: Alison

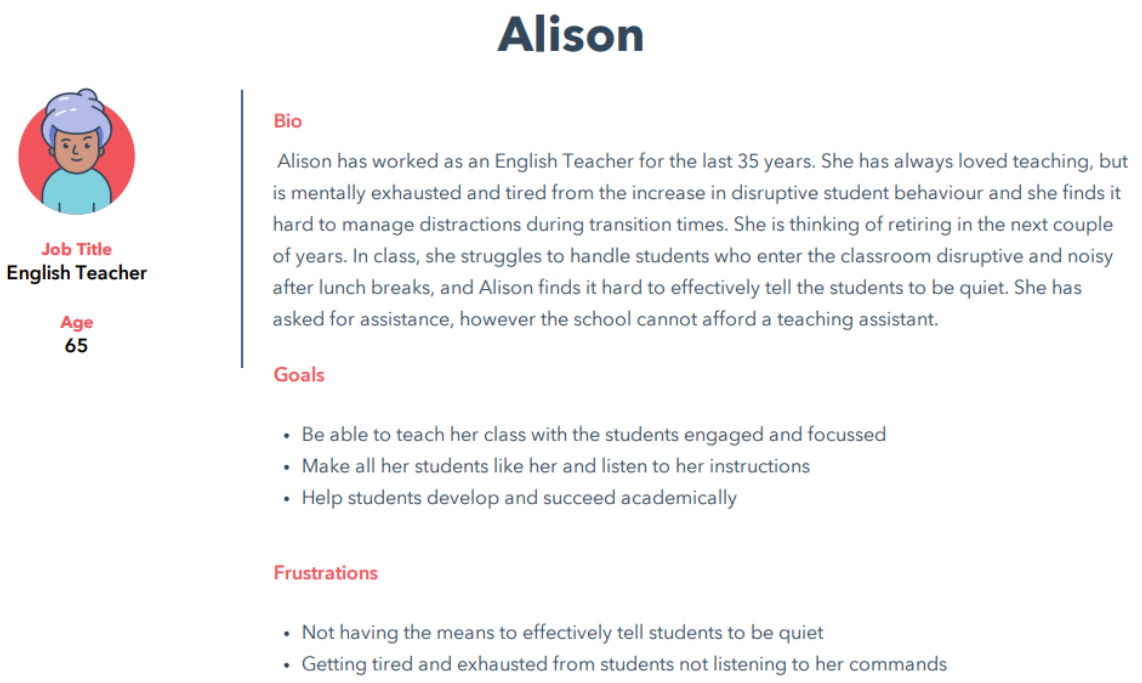


Figure 3: Persona of Alison, an English teacher

Alison is an English teacher, who struggles to control her class, especially during transition times where students enter the class after lunch (see *Figure 3*). She has asked for teaching assistance but the school cannot afford that in their budget.

2.4 Schools and Educational Institutions

Schools and educational institutions are directly involved when it comes to disruptive student behaviour and time-consuming transition times. Schools can suffer many impacts from excessive problematic students and disruptions to learning, which can limit educational development and hinder future students from advancing academically (see Section 1.2.2: *Consequences on Schools*). Schools will always want their students to achieve their best, thus this solution has been chosen so as to be able to slot into the majority of Australian classrooms between the grades of prep to two seamlessly. Schools would benefit directly from the positive impact on student performance that would result from the introduction of our solution.

Due to our solution being a device which schools would need to purchase, cost had to be considered. Our proposed solution is a relatively cost effective way to constitute well-needed assistance for students and teachers during these most-disruptive transition times making it an attractive addition to all Australian classrooms. Furthermore, the proposed solution will be designed to be considered as cost effective and easy to integrate, so that it can fit into any school's budget.

With the newer direction this project is heading towards with the focus on transition times, education Institutions and the curriculum should be kept in mind when creating the different types of themed activities during these transition times, so that they are related to the class at hand. As seen in the interview with user 3 in appendix 10.08, teachers find that using an themed/topic related video about the topic being taught, is an effective way to engage students so that they are engaged in the class and are being non disruptive.

2.5 Other Considerations: Parents and Caregivers

While we did not consider them formally to be stakeholders, the role of at home parents and caregivers had to be considered while forming our proposed solution due to their direct relationship when designing for children. Students can be more disruptive at school due to their home life and vice versa (see Section 1.2.3: *Home and Family Environment*). The introduction of our solution in classrooms leads to students becoming familiar with positive classroom discipline (see Section 1.3.1: *Positive Classroom Discipline*) which in turn would ideally be reflected at home where the parent or caregiver could adopt similar approaches to discipline.

Adversely, we had to consider how parents could be negatively affected due to the introduction of our solution: students' positive behaviour may become reliant on the device and lead to more acting out at home or parents may not approve of the approach taken by our solution to mitigate classroom disruptions. During the rollout of the device, schools would likely need to gain feedback from the parents and caregivers to gauge the effectiveness of the solution in regards to that particular demographic which is why parents and caregivers should be considered.

2.6 Stakeholder Engagement

Engaging directly with stakeholders through user studies was a priority for us when formulating our solution. We managed to include all the above mentioned stakeholders in at least one stage of user studies however ideally we would have had more representatives. The following lists describe which stakeholder groups were included in the surveying, interviewing and user testing. A more in-depth discussion of the findings from these studies can be found in Section 4.1.

Surveys:

- A teacher/parent
- A teacher aid/class helper

See Appendix 10.1 for the raw data collected.

Interviews regarding the initial concept:

- A primary school and special education teacher/parent

See Appendix 10.2 for the raw data collected.

User Testing regarding the interim critique:

- A primary School Teacher/parent
- A primary School Teacher
- A UQ Education student

See Appendix 10.8 for the raw data collected.

User Testing regarding the final iteration:

- A primary School Teacher/parent
- A year 2 Student (7 years old)
- A UQ Education Student

See Appendix 10.12 for the raw data collected.

3.0 Conceptual Model

3.1 Human-computer Interaction Conceptual Model

Table 2:

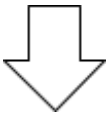
<table>
<tr><td colspan="3">Problem Statement: Problematic classroom behaviours, in particular noise disturbances, interfere with student learning. Specifically, based on research, a device is needed to address the issues related to classroom transition times (refer to Section 1.2.4 regarding theory behind classroom transition times). The solution should aim to give students both structured and engaging directions during transition times with the overall goal of reducing their total duration.</td></tr>
<tr><td colspan="3">High-level Description: The solution is a device called “CalmaPet: The Digital Classroom Pet”, deployed in Prep, Year 1 and Year 2 classrooms, displaying an interactive character that responds to the classroom. The character will be an animated, talking digital animal that will change each week to satisfy the interests and curiosity of students and allow them to learn about different animals, akin to a “classroom pet”. It will respond to classroom behaviour by mimicking emotions. The character on the smart-speaker screen will also be mirrored onto the class’s large smart board screen during the 10-15 minute duration of the entire transition time. After this transition period, the character will remain idle (asleep) on the small smart-speaker screen.

Based on the research so far, a two-phase programme to run during the transition time was conceptualised (refer to ‘Programme Phases’ for a breakdown of phases and Section 3.1 for user storyboard). The success of these phases is measurable, so a point system may be incorporated, with a theme-related reward, to incentivise engagement.</td></tr>
<tr><td>Interaction Paradigm:
Pervasive computing
Similar to that of Apple Homepod or Amazon Alexa.
Portable and interacted through sound and physical touch.
The sound will be a passive input: loudness of the environment measured in decibels, needed during phase one of the programme (refer to ‘Programme Phases’ and Section 3.1 for user storyboards)</td><td>Interaction Mode:
Primary input: auditory input through a microphone, this is to monitor loud noise disruptions, during phase one.
Viewing a tablet screen which will also be mirrored onto the classroom smart screen to further visibility and student engagement.
Pressing physical buttons on the device or connecting to the device through an application on another computer.</td><td>Key Interface Metaphors:
“virtual friend”
“virtual classroom pet”
“digital teaching assistant”
“smart-classroom accessory”
“interactive smart-screen”
“Siri-like impersonator”</td></tr>
</table>

3.2 CalmaPet Programme Phases

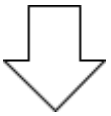
Phase 1: Settle-in Period

The first phase is the “settle-in period”, automatically beginning at pre-set times after school breaks, with the goal to calm the students down in preparation for the upcoming lesson. The device will play calming music, and react to the noise-level of the classroom. The ‘emotions’ of the character, music, and class lighting will change - good behaviour prompts encouraging reactions, happy music, and brighter lighting, while bad behaviour prompts sad emotions and dimmer lights. These responses are based on the literature and interview research, though further investigation needs to be undertaken into what reactions are most effective. This phase lasts until either a set time has passed or the noise-levels have settled successfully.



Phase 2: Transition Movement Break

The second phase is the “transition movement break”, please refer to the Transition Activity/Movement Break Example Table 3 in Section 3.4, beginning after the settle-in period, with the goal to engage the students. From a pool of themed activities, the device will select one to run. For example, if the virtual character is a tiger, the activities may be ‘tiger deep breathing’, ‘sing-along with tiger’, ‘stretching like a tiger’, ‘game with tiger’, ‘story time with tiger’, or ‘tiger trivia’. This phase lasts for a set duration.



Idle

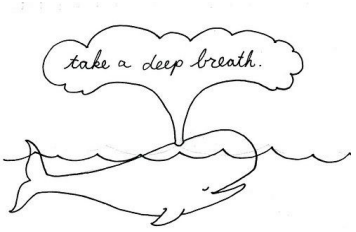
The “digital pet” will be idle (asleep) during class time to avoid distractions and active during transition times, where teachers can set a custom time period for how long they would like transition time to last.

3.3 Technical Requirements

Functional Requirements:	**Non-functional requirements:**
• The device must monitor classroom noise levels • The device must react to classroom noise level through audio-visual output changes and emotional response • The device must run and stop programme phases at the appropriate times • The device must cycle through a quantity transition movement break activities • The device must be mirrored onto the class's large smart screen for easy visibility during the 10-15 minute transition time period	• The device must be accessible to all stakeholders in regards to affordability, operability and understandability • The device must be robust to account for future changes to education and technology • The device must be reliable at detecting accurate classroom noise levels • The device must be effective at communicating with the classroom meaningfully, accounting for unique and special needs of diverse students and teachers • The device must be engaging by having a sufficient quantity of transition movement activities to cycle through as well as unique animal character personas

3.4 Concept Solution Transition Activity and Movement Break Examples

Table 3: Concept Solution Transition Activity and Movement Break Examples - each transition activity will be randomly selected and will last several minutes, forming Phase 2 of the CalmaPet Solution

PHASE 2: Themed Transition Activity/ Movement Break	Description	Example
Deep Breathing	Students will be guided on the smart screen by the designated “classroom pet” of the week regarding how to be mindful and calm down after a busy break outside. Students will be instructed - visually and audibly - to take slow, deep breaths and close their eyes. Through encouragement, students will learn how to be more mindful and regulate their emotions by following the “classroom pet” on the screen.	*Tiger Deep Breathing with Timmy the Tiger:*  *Whale deep breathing with Wanda the Whale:*  (Ronga, 2022)
Gentle Stretching/ Yoga	Students will be guided on the smart screen by the designated “classroom pet” of the week on gentle stretching and yoga. This movement break will be themed determining the habitat and theme of the animal that represents the pet of the week, such as a jungle for Timmy the Tiger. Yoga and stretching will help to calm down students and bring a sense of ease and mindfulness into the day.	*Tiger stretching up into the sky and down like a tiger into tiger pose with Timmy:*  (Happiful Magazine, 2022)

Storytime	Students will be told a short, themed story by the “classroom pet” of the week. This video-story will be interactive and showcased on the smart screen - audio and visual elements will engage students but will not be excessively stimulating to ensure students remain relaxed and are able to prepare for learning. Stories may include both fiction and non-fiction.	*Timmy the Tiger Goes to the Shops:* An example fictional story about Timmy the Tiger and his day at the shops. *All About Tigers:* An example non-fictional story where Timmy explains to users all about tigers, where they live, their habitat and some fun facts.
Calming Singalong	Students will be guided on the smart screen by the designated “classroom pet” of the week on a calming singalong. This will be slow and steady-paced and may include a slow song or nursery rhyme, led by Timmy’s example on the smart screen.	*Relaxing Tiger Nursery Rhyme:* Timmy will guide and lead students through a slow but engaging nursery rhyme song on tigers. Lyrics and interactive video content will be displayed on the screen, allowing students to learn the song. Optional “actions” to some of the key words of the song will be showcased by Timmy on the smart screen.

3.5 Design Illustrations

The following illustrations were constructed to convey the concept quickly to users for user testing as well as to inquire peers and tutors. Additionally, a video was made to show what kind of content the device will display on its screen. The two videos can be found at the following link:
https://drive.google.com/drive/folders/1xjiNqkqpSeX_p1DFkTp5hupGpOHDSkV-?usp=sharing

Figure 4: Updated Digital Solution Concept Design

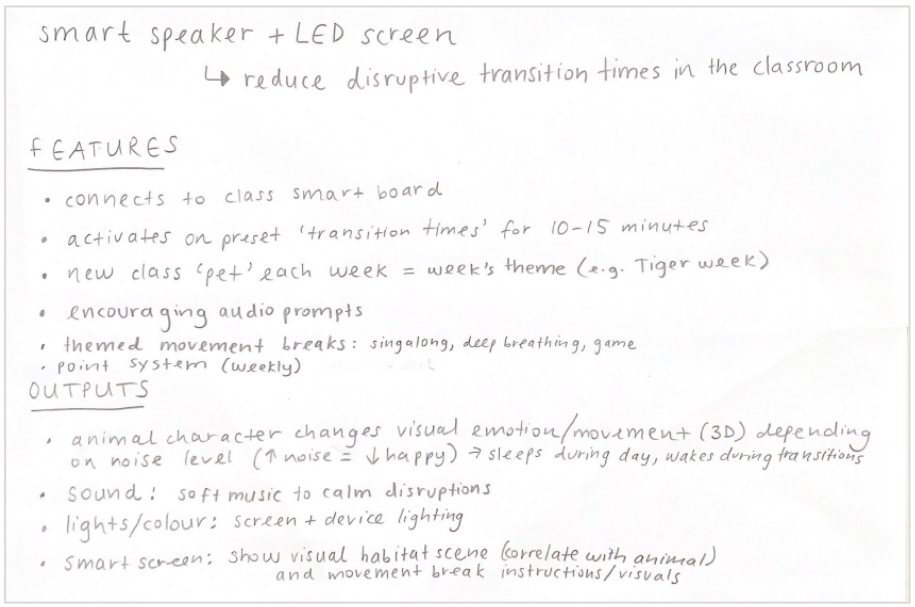


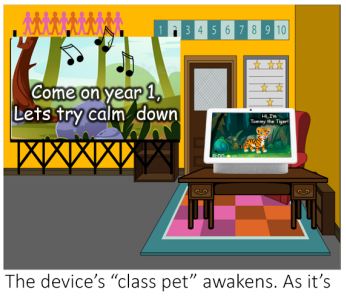
Figure 5: Updated Concept Key Features

3.6 Storyboard

The following user storyboard was designed and produced in order to illustrate an example user flow of the *CalmaPet* smart speaker solution. It showcases an example Year 1 class and their teacher, Mrs Young, interacting with the smart speaker solution for transition time after a lunch break. Refer to Appendix 10.13 for original hand-drawn paper storyboard.

Mrs Young's year 1 class have just finished lunch and are coming back to class, all excited and noisy

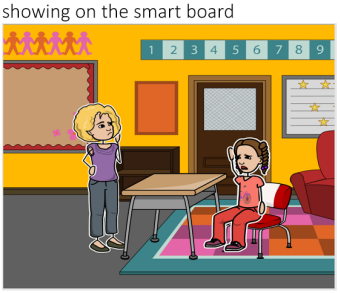
The CalmaPet smart speaker solution is located in the classrrom, near the teachers desk. At the end of lunch break, the device wakes up, ready for transition time. Mrs Young has set transition time to last 10 minutes for her class



The device's "class pet" awakens. As it's Monday, there's a new pet for this week- Timmy the Tiger. Timmy hears the class coming in noisily and starts looking upset + blue. He encourages everyone to settle in by playing calming music, also showing on the smart board

Timmy the Tiger helps students to settle into their seats, encouraging students the more they quieten down. Music continures playing, helping relax the class and a movment break begins.

A tiger- themed movement break begins. Timmy the tiger guides Students, on the smart board, through a tiger stretch and deep breathing break. Students follow along



Mrs Young is able to attend to other students, important matters and prepare for the lesson. The Year 1 class was able to transtion and feel relaxed, last disruptive and more ready to learn.

Figure 6: CalmaPet User Storyboard Digital Design

3.7 Ethical Considerations

Understanding ethics and learning to consider ethics when designing is important and needed (Ethics for Designers, n.d.). Designers are often trained to problem solve and create new or better solutions for existing problems (Ethics for Designers, n.d.). But with the nature of design being subjective, what one person or group designs is never really neutral, and may not necessarily be ‘better’ (Ethics for Designers, n.d.).

With this in mind, we have noted some points and questions which consider the ethics of our concept:

- Children and a digital solution
    - What are the short- and long-term risks and benefits of using a digital solution for behaviour prevention/interventions?
- Device taking the “job” of a teacher
    - We have designed our concept to be used as more of an aid for teachers, as opposed to taking their job. Yet in the real problem context, it is unknown whether this would become an issue or impose negative effects in the classroom environment.
- Privacy
    - What if a teacher didn’t want to use it/thought it was an invasion of privacy in their classroom?
- Collection of data
    - Is data collected, and how and where is this data stored if it is? Who has access to this data?
- Constantly recording/monitoring noise levels, especially of young children
    - Due to this, would this require parental consent to be used? Would it require unanimous consent from every child and parent of the class to be able to be used?
- Dialogue responding to children
    - What are the implications of children interacting with A.I.-like technology, especially at a young age and in a school environment?

As a design team, we acknowledge that we are not children nor teachers, and thus our proposed concept solution may or may not actually provide a suitable solution in a real life context of use. Our proposition only takes into account a few months of research and designing. As evident, there are ethical matters concerning our design that we are both aware and unaware of as a team. Further progress into designing and developing this concept in the future would have to consider these ethical matters. More research would need to be conducted to better understand these matters, in order to establish a good and effective design solution for the identified problem scope.

3.8 Success Criteria

The criteria for assessing the success of the device is shown in table 4, with suggestions on appropriate evaluation methods for each requirement.

Table 4:

Requirement	**Evaluation Method**
The device must monitor classroom noise levels	Experimental testing - successful if noise detection level matches actual noise level
The device must react to classroom noise level through audio-visual output changes	Experimental testing - successful if reactions match specifications
The device must run and stop programme phases at the appropriate times	Experimental testing - successful if start and stop times match specifications
The device must cycle through a quantity transition movement break activities	Questionnaire - successful if greater than or equal to 80% of participants state that there was a sufficient quantity of transition movement break activities
The device must be accessible to all stakeholders in regards to affordability, operability and understandability	Stakeholder interviews - successful if device's cost and classroom use is approved by relevant institutions
The device must be robust to account for future changes to education and technology	Literature research into finding emerging obstacles for this technology in the classroom.
The device must be reliable at detecting accurate classroom noise levels	Experimental testing - successful if noise detection level matches actual noise level, with specified accuracy Life-cycle assessment - successful if device is predicted to last for a specified period of time
The device must be effective at communicating with the classroom meaningfully	System usability scale questionnaire - successful if positive response received
The device must be engaging by having a sufficient quantity of transition movement activities to cycle through	Technology acceptance model questionnaire - successful if positive response received

4.0 Prototyping and Studies

In order to further explore and investigate the problem space of disruptive student behaviour and disruptive transition times, several key design activities were conducted with stakeholders. This allowed for a deeper understanding of the problem space and the solution space to be gathered and included a survey and several in-depth qualitative stakeholder interviews. Further activities for the next Build phase of work have been proposed. This includes, further in-depth literature research, quantitative questionnaires, more interviews specifically with the user target group of school students, user testing on the prototype product, the creation of refined user personas and storyboards as well as co-design workshops with users and stakeholders. These key design activities and methodologies will effectively inform and guide the next team's design process.

4.1 Studies

Three full rounds of user testing, namely qualitative interviews, were conducted for each key phase of project work - Problem Identification, Interim Critique and Final Exhibit. A key survey and interviews were conducted with several stakeholders in the education sector, particularly teachers and educators working with children and school students. These studies aided in further identifying and understanding key issues in the problem space as well as potential aspects to be incorporated into the solution space. However, it is important to note that initial sample sizes of these studies were low, with nine initial responses overall, as specified in the Appendix Testing Plans. Although these smaller sample sizes may potentially result in skewed data and limited insights, careful work was made in sourcing quality respondents that represented a diverse mix of the stakeholder group. Users were sourced through personal network connections which were deemed sufficient and insightful for initial proposal studies. Refer to Appendix 10.1, 10.2, 10.3, 10.7, 10.8, 10.11 and 10.12 for further raw data and study methodology regarding the three main rounds of testing that were conducted.

4.1.1 Survey

The first initial survey conducted aimed to determine stakeholders' experiences working with children and observing and managing disruptive student behaviours (refer to Appendix 10.1 for survey questions and results). Survey data uncovered that the main type of disruptive behaviour recognised in educational settings included verbal and vocal disruptions, such as *yelling, shouting, swearing* and *calling out in class.* These forms of behavioural disruptions were found to be taxing on educational staff and particularly *frustrating* for some. Furthermore, respondents commented that the main consequences of these behaviours included interfering with teaching and decreasing the quality of education delivery, overall a negative experience for both students, their peers and teaching staff as a whole. As to

causes of such behaviour, respondents described *learning issues, personal issues* and *boredom* as key associations to increased disruptions.

As well as discussing the challenges of problematic student behaviours and in-class disruptions, survey respondents also described their experiences with current behavioural management strategies and interventions used in classrooms. All respondents stated that *positive discipline* and *positive behaviour management* were crucial in the effective regulation of student disruptions. Rather than focussing on punishing negative student behaviours, it was found that encouraging positive actions was much more effective. It was recommended that supporting children through engaging lessons is especially effective in further reducing problematic behaviour. The use of technology in assisting with a potential solution was also positively received by respondents, who suggested that technology could *be really helpful supporting students to manage their actions and not distract others,* as well as *make lessons interesting and engaging.*

4.1.2 Preliminary Interview

A preliminary qualitative interview was conducted with a primary school teacher to further uncover key insights into patterns of disruptive behaviours as well as determine whether a digital solution could support classroom and teaching procedures (refer to Appendix 10.2 and 10.3 for interview questions and raw data results).

From the interview, further in-depth knowledge surrounding disruptive student behaviour was gathered, from the eyes of a classroom teacher. This proved extremely helpful in further developing and retrieving insights into the problem space and environment. The respondent detailed the many impacts and observances of problematic classroom behaviour, and its particular "*far-reaching"* consequences, from students to teachers and society on a wider level. As commented on the pressing need, "*the sooner this disruptive behaviour is analysed and supported by the teacher, the better off the student is, the better off the other students are and the better off society is. So everyone benefits. Only through quality education can children thrive and truly develop to benefit society."*

Moreover, current behaviour management interventions used in primary school classrooms were discussed. The respondent described the many frustrations and inefficiencies of current strategies, stating, "*there's a lot of detentions and punishments… this hasn't been working very well…"* In terms of effective classroom environments, interview findings correlated with research data that supported positive approaches to behaviour management and not focussing on a child's negative attributes, which can present as a significant barrier to reducing disruptions. It was described that effective and productive classrooms "*focus on the good qualities and positive attributes… praise and support students."* The respondent continued, "*what works is allowing the child to learn in a positive environment… I think there needs to be a shift in focus to looking at a child's good qualities… if a child does one thing*

right all day, then that one thing should be highlighted as that would encourage the student to do the right thing."

As to the level of noise in the classroom, the respondent's experience with classroom noise was mostly negative, however stating that *"noise level differs according to what's happening… It depends on the activity. Is the teacher teaching, are there group activities, or are students working independently?"* Their experience with escalated noise was high, including classrooms where students are not using their "*inside voices",* rather yelling, becoming aggressive or getting upset. *"The impacts of a very noisy class make the learning hard to focus on. You can't even talk or hear anything so learning almost stops for everyone. The noise level should only be zero, low or moderate depending on the type of lesson happening."*

When asked about the role technology could play in assisting classrooms to become less disruptive through reducing problematic behaviour, the respondent was extremely in favour and supportive of integrating a digital solution in schools and had several ideas of possible solution spaces. In particular, the respondent explained the frustration of "*transition times"* at schools, the specific times throughout the day when "*students first arrive [in the classroom] and the noise level is high for 10-15 minutes until their bodies calm down from physical activity and from outside".* This is an especially "*noisy and disruptive time of day"* and the respondent suggested a technological solution could potentially help target *"the whole class to calm down and get ready for learning in the classroom… music and technology would be helpful to calm down."* Furthermore, the respondent commented that technology could positively benefit the classroom by helping students to *"transition from outside breaktime to inside learning… one of the hardest times of day… it's hard to also attend to the whole class and calm disruptions."*

Following this, the respondent was showcased the current potential solution (see Section 4.2), and was questioned as to whether this solution would be effective or potentially ineffective. For the most part, the respondent was very positive towards the concept and was able to clearly understand the aim and key features of such a solution, commenting, "*I think it's actually such a fantastic idea. The reason for that is that there is disruptive behaviour that needs to be attended to - this will help the teacher so the teacher has more time for actually teaching than wasting it on disruptive behaviour, the second reason is that students really get engaged and love technology."*

The respondent appreciated the noise level measure features of the design and found this to be an effective aspect in reminding students to reduce or tone down their voices. The visual and light features were also supported as well as the device's voice prompts, which would "*save the teacher's voice",* and the device's recognition of the teacher's voice, to allow the teacher to speak louder when needed.

However, in regards to areas of improvement, the appearance of the device itself was found to be a potential weakness, as suggested, “*the device though does not look that fun or exciting - maybe if it had a different shape or the structure or design could be different - maybe have a character or something.”*

Overall, the respondent felt the potential solution would integrate well with the classroom environment as there are many other forms of technologies used in classrooms today. The respondent further elaborated that there is a *“big gap in education with these types of technological devices, it’s a much needed product that's not really out there yet. There's a definite need and market for such a solution.”*

Further suggestions and design ideas made during the interview included:

- *The smart screen could be used if it isn't being used for teaching… maybe connect to the screen in the classroom and show some sort of visual prompt like a character or a scene from nature or something the kids are interested in that would get their attention and help to remind them to stay focussed.*
- *It could have more vibrant colours and be a character. Maybe the character it comes in could also go on the screen or there could be a family of characters.*
- *Maybe some sort of little 60 second game to help the kids or challenge for the transition time or a five minute silent challenge and the noise level measure will see if the class can get points for five minutes of quiet time when they first come in*
- *Students could get classroom points for the day and the week and the teacher could give a reward to the class if they met the points. Then the students have an incentive to work towards reducing disruptions. That would work well with the teacher and the device working in a team and together they achieve reduced disruption. In a way it's like a mini assistant of the teacher - almost a teacher assistant which really helps the whole learning process - it's a win win, students win by engaging with the device and getting rewarded, teacher wins through less disruption and more learning.*
- *Setting a custom noise level for different activities.*

4.1.3 Transition Time Interviews

In response to valuable feedback and user data received regarding narrowing down the solution space to focus on a more specific classroom environment and target group, that of transition times in grades prep to year 2, another qualitative interview was planned and conducted with several key stakeholders. These interviews aimed at gaining suggestions and feedback on the focus area of disruptive classroom transition times as well as user thoughts and ideas of the current updated prototype concept, which was refined after the previous set of studies and phase of work. Refer to Appendix 10.7 and 10.8 for testing plan and raw data results.

From the interviews, valuable insights surrounding classroom transition times were gathered. Respondents were all familiar with the disruptive pattern of these transition times and

commented on the many negative impacts these times have on teaching processes, including leading to "*even more time being wasted as more students become upset and disruptive… like a chain reaction and next minute the whole class is distracted… it eats into the learning time and it takes even longer to bring the class to a calm state to learn."* Other impacts teachers found with these times included "*less learning time and a decrease in teaching and learning quality",* with one respondent describing these times as *"a genuine pain".*

Respondents described how they give a set amount of time each day to allow students to transition, with current management techniques including "*silent reading, silent drawing… a game"* as well as *"positive rewards for students who transition well… reminders for students who do not transition well…brain breaks or an easy activity".* One user commented on the difficulty assisting students with special needs during these transition times, where *"some students show complete defiance to transition well"* and *"lunch times often cause some students, particularly those with ASD or ADHD, to become heightened".*

However, regarding the effectiveness of these current strategies, respondents described that "*playing a competitive, loud and exciting game doesn't always work. It hypes them up, whereas doing a calming activity is effective."* Respondents stated that what is needed most to reduce the disruptiveness of these transition times is a set of better tools to support the classroom teacher to spend the transition time attending to other students that may need assistance following a lunch break. Moreover, "*being consistent"* was found to be a critical requirement to creating calmer transition times, where having a set routine for students to follow during the minutes following their lunch breaks is key to encouraging students to listen to expectations, with one user commenting "*kids thrive on routine".*

In terms of the level of disruption and noise during transition times, this was described as "*not good",* where students have come from outside and "*suddenly enter the classroom zone where the noise level has to be reduced"* and *"struggle to readjust to the classroom environment and calming down",* with one teacher describing the frustrations of noisy transition times which impede learning preparations and create difficulty talking over the top of students. The most disruptive transition times of the day were found to be when "*students enter the classroom after each lunch break or after a specialist lesson"* creating a *"much higher level of disruption",* as opposed to between class lessons and when students first arrive in the morning. In terms of the grades with the most disruptions transitioning, one respondent stated that *"generally the younger kids take longer… for them to get settled".*

Respondents were showcased the updated solution concept design, as illustrated in Section 4.2. All respondents reacted positively to the solution's purpose and key functionalities, commenting "*it's pretty excellent…it will capture the interests of the students… they will look forward to coming in from the breaks…and making the animal happy", "I think it's especially good for the little kids".*

Users found the character's emotional response very effective in allowing students to take ownership of the transition period and find motivation to make the class pet happy. The themed movement breaks were also positively received, especially activities that are calming and relaxing for students. The peaceful music was also found to be an effective output to assist and encourage younger students to settle in. The collaboration with the in-class smart screen was also pleasing to respondents, stating that using the smart board makes it "*even more useful and [is] catering for a great need".* Moreover, users found the device to look effective in terms of allowing the teacher to attend to other matters during the transition time, so it "*isn't just the teacher speaking",* which allows for students to create their own routine and become consistent, *"it gets them into the habit of seeing this immediately. Okay, cool. We're here now. Learning".*

In terms of areas of improvement, some users suggested adding little stories as part of the movement breaks and other creative activities that use the same animal of the week. Furthermore, integrating educational content through the interactions was also suggested, such as little animal facts for students to transition into learning as they also have fun. One user suggested allowing teachers to customise device controls and settings, such as to "*choose the pet, set the volume expectations based on the activity…choose the movement break".* In terms of budgeting, one respondent suggested making the program available for computers in the case where schools cannot access the specified device technology.

Overall, all respondents found the solution very pleasing and felt the concept and design would positively assist procedures during classroom transition times.

Further suggestions and design ideas made during the interview included:

- Outputting the animal's actual animal sounds, including tiger growls when it's upset
- Incorporating the animal's mannerisms into its emotions
- Incorporating the animal into the movement breaks such as tiger movement, yawning, yoga
- Short game or quiz or collaborative drawing for movement break
- Customisable settings
- Using the device when the teacher wants throughout the day - "*The teacher could set noise levels for when the students are working to make sure the students aren't getting too loud during learning time, and the pet could monitor this with their emotions"*
- Allowing the class pet to be a role-model and show how students should act
- Ensuring the animal showcases positive reinforcement and encouragement over extreme negativity
- Ensuring the screen in projected onto the smart board during transition time so it is *"central"*

4.1.4 Interviews with Paper and Video Prototypes

For the third round of user testing, three users were presented with various paper and video prototypes, interspersed with interview questions (see Appendix 10.12 for raw data). One user was a Year 2 Student, aged 7 years, another was a Primary School Teacher, and another was a UQ Education Student. The aim of this testing round was to gain insight regarding the most effective digital avatar to present our target users. We sought to answer two main questions:

1. Which is better, a role model or a reactive/emotive response?
2. Which avatar is better, class friend or class pet?

According to research, as given in Section 1.5.3, children as young as 6 years old can recognise basic emotions, and having such skills is significant for knowing how to respond socially, including responding to teachers (Lawrence, Campbell & Skuse, 2016). With this in mind, we wanted to thus understand whether using emotions or a reactive response would be an effective method with a digital avatar. This would be compared to having a role model figure instead. Our conceptualisation also considered the use of an animal avatar, as we thought this could help gain the interest and attention of our young target audience. Feedback received had posed the question regarding how the type of avatar would affect children, which we wanted to explore to help influence our design decisions. Thus we tested to see the effectiveness of using an animal avatar, like a class pet, versus a human avatar, like a class friend.

From our studies, we have made the following conclusions regarding the two questions we wanted to address.

1. Using a combination of both a reactive/emotive response from the avatar and role modelling behaviour could be beneficial for preventing disruptive classroom transition times.

2. Using an animal avatar over a human avatar would be most effective for facilitating positive classroom transition times.

Using a combination of role modelling and a reactive/emotive response

All participants had fairly positive responses regarding their perceptions of the effectiveness of either condition in helping the class settle down and get focused for the upcoming activity during a transition time. Whilst the student demonstrated a preference for the reactive/emotive avatar in their explicit response (see Appendix 10.12), their responses toward how they would behave upon seeing either condition of the avatar provides support for using both role modelling and a reactive/emotive response from the avatar. Whilst finding something more engaging could garner a positive response from children, it doesn't

necessarily guarantee positive behaviour. Therefore, looking more closely at behaviours for either condition gives more meaningful insight, especially if the intention is to facilitate certain behaviours.

Unfortunately, actual behaviours were not observed in actual classroom transition times with the prototypes, but we did get the student's responses describing how they would respond. Our studies demonstrate how in both conditions, the student would behave positively, each due to different underlying reasons. For the reactive/emotive condition, the student's response expresses a sense of empathy, which seems to be the influence that would lead them to behave in a positive manner and encourage their classmates to do so too. Whereas in the role model condition, the student recognises the positive and intended behaviour and would want to replicate it, in this particular case, because they express a liking of their teacher.

This response from the teacher also helps justify why using both conditions could be most effective for the purpose of facilitating positive classroom transition times. She states,

> *"A combination of both would be best - the second one [role model] shows how to act but the first one [reactive/emotive] will relate to the students' emotions and is important as it conveys personality and mood which will be very effective in raising awareness of the classroom noise level and encouraging the class to quieten down."*

Students are likely to benefit from having both role modelling and a reactive/emotive response of the avatar. Whilst it can be acknowledged that some students may not respond in the particular manner described by our student participant for either condition, it can be assumed that most may exhibit the desired positive behaviours as a response, as per the teacher's responses to how they believe their class would react to either condition, which can be seen in Appendix 10.12.

Using an animal avatar

In regards to the form of the avatar, there was an agreed consensus from all users that using an animal avatar would be better for the solution over using a human avatar. This is mostly due to two main reasons identified. One is due to the greater enjoyment and fun facilitated from using an animal avatar. The student participant had said, "I liked the tiger more 'cause it was funner to look at and cuter and it was really cute when it was breathing so I liked that". Likewise, the teacher also described how "it's more fun for the kids and they really enjoy animals". Secondly, using an animal avatar is more attention-grabbing for children. The teacher had expressed how it "will get their attention much better if a character is used over a human being as they are listening to a human being, a teacher, all day". The education student also stated that, "... kids tend to empathise more with anthropomorphic creatures … I

think it makes it easier to kind of depersonalise and helps them focus on what's being explained".

Therefore, it is likely most effective if an animal avatar is used in the solution to provide students with a fun, engaging and attention-grabbing avatar. It could help facilitate positive classroom behaviours during transition time, especially considering that boredom and disinterest is associated with disruptive behaviour (Livingstone, 2015), as described in Section 1.2.3. If students are presented with an avatar that they will like and consider engaging, they are much more likely to be interested with the visuals and content presented, and the class.

Areas of improvement and other design considerations

Below describe some things to consider in the proposed solution, as according to user participant interview responses.

- The movement break after entering the class should be non-physical and something to calm the kids, as it's time for students to calm down to a seated situation after having been walking and running outside prior to entering the classroom.
    - e.g., like the tiger deep breathing example we presented in one of our video prototypes
- Physical activity should be used only between lessons.
- Having the instructions be read aloud as some children may not be able to read well.
- In regards to the tiger breathing prototype video, as expressed by the teacher participant: "I did find the video too fast though and the music was too upbeat for calming down, I liked the imagery though. The music should be slower."
- Suggestions for animal avatars to use:
    - From the student: koalas, dogs, bunny rabbits, cute kittens
    - From the teacher: giraffe, elephant, hippo, camel, crocodile, shark, whale, turtle, monkey, birds (e.g. toucan, rainbow lorikeet), reptiles, mammals, amphibians (e.g. frogs), fish
    - From the UQ education student: other jungle / savannah animals (e.g. "Leo the lion", "Ellie the elephant")
- Suggestions for animal avatars not to use:
    - From the student: snakes
    - From the UQ education student: bird, insects or something similar to such

Limitations of the study

1. Limited number of participants — only three participants were involved in the study
    - Only had access to testing with one student in our target user group.
        - Only one of our team members had access to testing with a young student that they knew personally.

        - Recruiting a group of young primary school students for user testing that we don't know personally is difficult and would require parental consent and other protocols that were not feasible.
    - Cannot accurately assume that the provided results are representative of the entire user group we are targeting of early primary school students.
        - The response gathered from only one student is very subjective and biassed towards their singular opinions and views.
    - Only had access to testing with two individuals in the education sector.
        - Cannot accurately assume that the provided results are representative of the entire stakeholder group of teachers or individuals in the education sector.
        - The response gathered from just two individuals in the education sector is very subjective and biassed towards their opinions and views.
        - Teacher / education student responses are biassed towards their perspectives — though they work with children, they are not children themselves; the proposed solution and prototype is targeted towards young primary school students, with teachers being significant stakeholders.
2. Assumed behavioural responses are not necessarily indicative of actual behaviours.
    - All participants only described how they or the class may respond to the prototypes presented.
    - Actual behaviours were not observed, nonetheless in the environment that the solution is being proposed for — i.e., during classroom transition times.
    - Actual behaviours can easily differ from what one may assume that another would behave like.

4.1.5 Key Contextual Insights

Overall, key insights from both the survey and interviews showcased positive findings in terms of the problem space as well as the solution space and focus area. Key findings included:

- Problematic student behaviour during transition times causing teacher frustration and negatively impacting student performance and education quality
- Disruptive student behaviour linked to student learning difficulties, family issues, boredom and poor classroom environments
- Current behavioural management and transition time strategies focussed on educating rules and positive discipline, with negative approaches hindering student engagement and development
- A digital solution could meaningfully complement the classroom environment to help minimise student distraction and disruptions through an engaging, interactive and fun experience

- A proposed solution to reduce transition time disruptions in prep-year 2 classrooms would be supported by teachers in effectively increasing student engagement, reducing student distractions and preparing for a smooth transition from outside breaktime to inside learning
- A proposed solution which incorporates a combination of role modelling behaviour and reactive/emotive responses is likely to be effective in helping facilitate positive behaviours from students during classroom transition times
- A proposed solution, namely *CalmaPet,* which incorporates animal avatars for the visual component and emotional response is likely to most effectively get students attention and provide more enjoyment

4.2 Prototyping

Figure 4 and 5, as shown in Section 3, and *Figure 7 and 8* below, display the low-fidelity prototypes that were showcased to users during qualitative interviews. *Figure 7* illustrates the concept sketch design. Refer to Appendix 10.3, 10.8 for raw data.

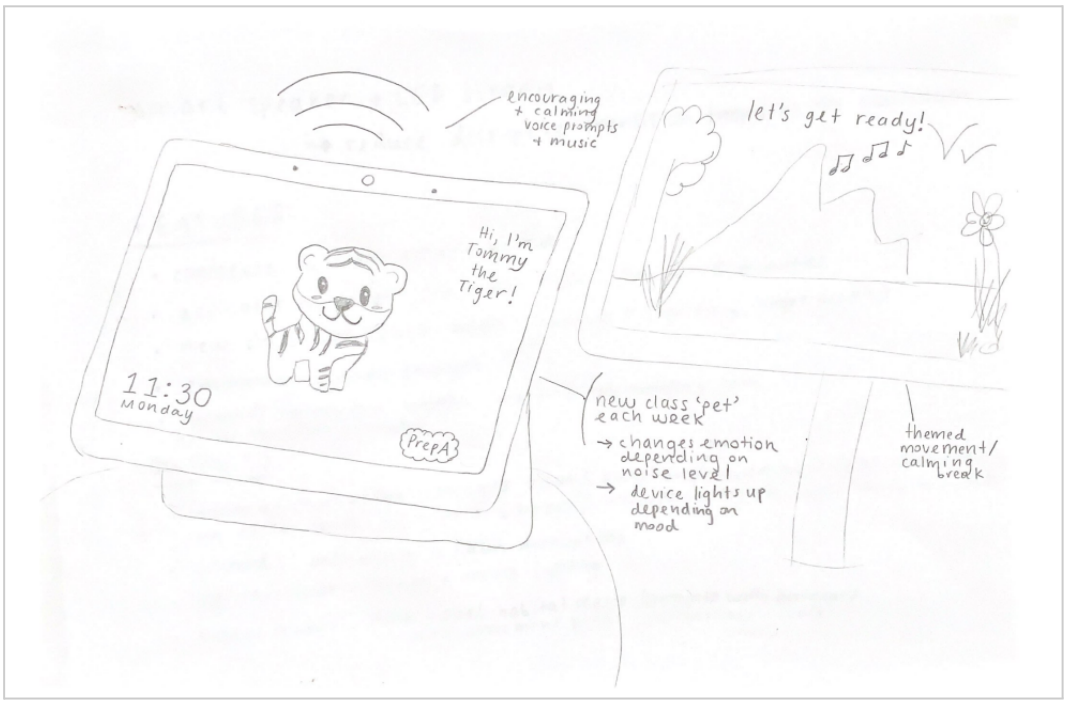


Figure 7: Paper Prototype Design for User Evaluations

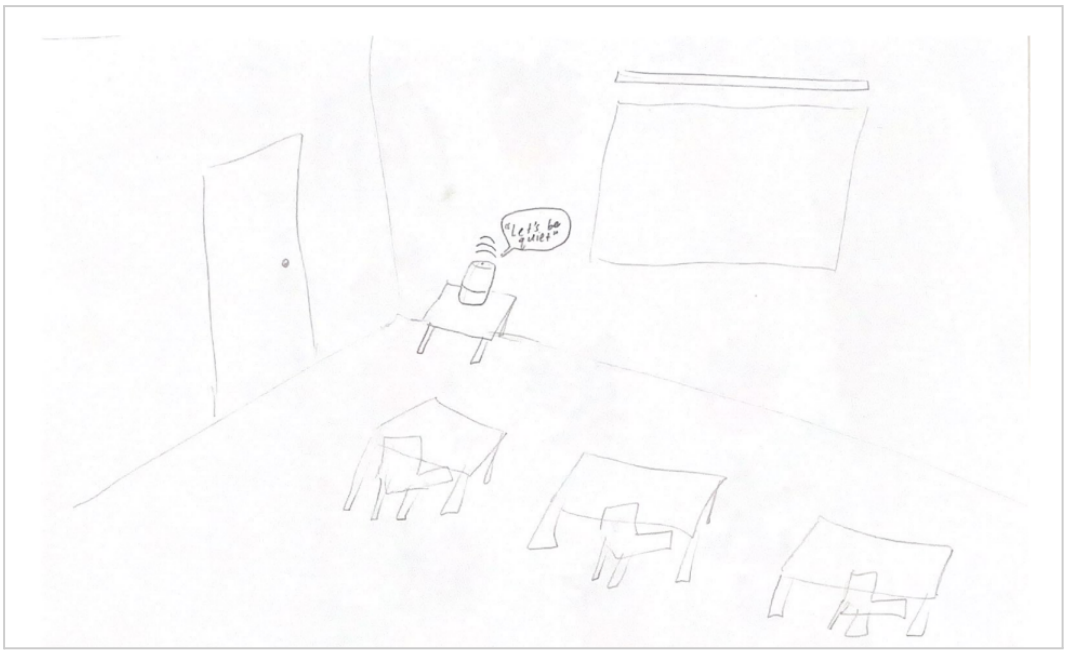


Figure 8: Interview Prototype Context Design for User Evaluations

Following the user studies conducted on the above figures, we began formulating scenario-based prototype ‘screens’ which were used to evaluate how users react to the digital classroom pet. *Figure 9* is an example of one of the ‘screens’ where the character is upset due to heightened noise levels.

Disruptive Classroom Transition Times

Figure 9: Example Prototype Screen for User Evaluations

To further solidify our solution concept and bring our user testing feedback into action, we generated 2 digital medium prototypes in video format which incorporate our 2-phase system described in Section 3. These videos can be viewed here. We showcased these prototypes at the exhibit to assist in portraying what our proposed solution may look like in action. Refer to *Appendix 10.16* for the slides included in each prototype video. These videos are to be imagined as if they are displayed on a smart-home like device as shown in *Figure 4* as well as mirrored on the classroom smart screen. An example screen from one of these prototypes is shown below in *Figure 10*.

Figure 10: Example Prototype Screen for Exhibit

All prototypes created by our team can be viewed here. This includes all fidelities and drafts.

5.0 Project Plan

5.1 Project Breakdown Plan

The following project breakdown plan (see *Table A*) was created to outline the team's key project tasks and milestones as well as define specific design activities and research tasks required for the completion of a successful and high quality final project proposal.

Table A: Week by week project plan outlining key tasks, deliverables and project milestones.

	Task	**Deliverables**
Week 4	• Share ideas with each other • Narrow down problem space	• A list of ideas from each other
Week 5	• Identify problem scope and problem space • Specific age groups and problem • Think about potential solution • Background research & Literature review (Michelle, Amelia, Weirui) • Identify stakeholders (Kai) • Conduct preliminary qualitative interview (Amelia)	• Problem Identification Report • Presentation • Conceptual model • Preliminary sketches of prototype
Week 6	• Define and Elaborate Conceptual model (Martin, Michelle) • Conduct Disruptive Student Behaviour Survey (Amelia) • Designing low-fidelity prototype/initial sketches of potential solution (Amelia) • Project plan (Weirui) • Preparation for presentation (Kai, Amelia, Michelle)	
Milestone 1 : Project Ideation/Identification (05 Apr 22 10:00 - 08 Apr 22 16:00)		
Week 7	• Narrow down the problem scope into a specific problem in disruptive behaviours according to feedback from the presentation - disruptive behaviours during transition time • Use music, visual cue to set the environment and research outputs • User testing & evaluation 1 (with educators and teachers) • Further research to better understand	• Refined sketches of prototype • Refined conceptual model • User testing results

	user needs and expectations ● Iterate and refine design sketches and mockups ● Refine 1 according to feedback and evaluations ● New team member: update them on team project and problem space and ensure seamless collaboration can take place	
MidSem Break	● Change background research from 'disruptive behaviours' to 'transition time' (michelle/chris/amelia) ○ What is transition time? ○ What are the disruptive behaviours in the transition time? ○ How to reduce disruptive behaviours in transition time ● Report Overview ● Transition Time Interviews ● Concept refinement ● Concept sketches ● Creation of in-depth user personas ● Get feedback from user testing ● Analyse user testing results	● Refined concept model ● Refined prototype sketches ● User personas ● User testing results
Week 8	● Develop user storyboards ● Refine conceptual model ● Incorporate feedback into report ● Team reflection	● Presentation ● Interim Project Critique Report ● Refined concept model ● User storyboards
Milestone 2: Interim Project Critique (26 Apr 22 10:00 - 29 Apr 22 16:00)		
Week 9	● Conceptual model refinement ● Prototype refinement	● Refined concept model ● Refined prototype
Week 10	● More sketches ○ Tiger movements for movements break ■ tiger stretching/yoga with music - Chris ■ person stretching/yoga	● Sketches of prototype ● User testing plan

	with music - Krista ○ Tiger with different emotions ■ Sleeping tiger - Kai ■ When children come in - avatar upset - Amelia ■ Happy tiger - Martin ○ role model - Michelle ● User Testing Plan (Amelia + Michelle) ○ Show sketches with questions to target users (children/educators) ○ Interactive testing (Look at children's response to the interactions) ○ Testing on avatar (class friend or class pet)	
Week 11	● Refinement on the final report ○ Background research - Amelia/Krista ■ remove unnecessary sections (as we narrowed down our problem scope) ○ Stakeholders - Krista ■ Mention parents as minor stakeholders ○ Conceptual Model - Martin ■ Add technical requirements through functional requirements/ non-functional requirements ○ User testing analysis - Michelle ■ Analysis on why choose animal avatar ○ Prototype refinement - Krista ■ Use video to show the whole scenario in a dynamic way ○ Questions (Amelia + Kai) ■ What further research is needed ■ What are the remaining questions? ○ Project Plan - Chris (Weirui)	● Refinement on the final report ● Final user testing results

	■ Make the current project plan more actionable ■ Delete the gantt chart ○ Reflection - Kai ■ commentary on the team's work on the project through the whole semester ● Create name for solution - Amelia ○ CalmaPet ● Final user evaluations/testing - Amelia + Kai	
Week 12	● Prepare for final report & presentation ● Exhibit Plan ○ Research Poster - Amelia ■ Research, user studies, design, audience, problem space, direction taken ■ Stakeholder with personas ■ short quotes from user interviews ○ Design Process Poster - Michelle ■ Design process /solution explanation ■ Timeline with different prototypes ■ Photo of the final solution ○ Prototype Poster - Krista ■ product info ○ Pitch slides - Martin + Chris (Weirui) ○ Video of Timmy tiger example - Kai ○ Final Prototype sketches - Kai	● Research Poster ● Design Process Poster ● Prototype Poster ● Pitch Slides ● Prototype Video
Week 13	● Final Report ● Exhibit	● Final Report ● Presentation
Milestone 3: Project exhibit and documentation (31 May 22 10:00 - 14 Jun 22 16:00)		

Milestone 1: Problem Identification

The following (see *Table B)* represents the feedback that we received from Project Identification's presentation in Week 6 as well as tutor feedback, and their corresponding solutions:

Table B: Feedback received from Project Identification's presentation and their corresponding solutions.

Presentation + Tutor Feedback	**Solutions**
Research other modes of communicating with students apart from voice (distracting?)	Find out are there any current visual solutions for it? Example: https://bouncyballs.org/
Is disruptive behaviour linked to teaching methods? Gendered learning requirements?	Further research on the relationship between gender and disruptive behaviours has been done. Male students are more likely to exhibit disruptive behaviours. (This is discussed in 1.2.1)
Should identify the most common disruptions and how they are dealt with.	Further research on the most common disruptive behaviour has been done. 'Talk out of turn' is the most common disruption (discussed in 1.2.1), and teachers do not have specific solutions to this.
Look into child Psychology and how discipline works on them.	Further research on child psychology according to disruptive behaviours will be conducted.
Digital does not mean unbiased	Further research on potential biases will be conducted.
You could also consider what kinds of classroom environments you're focussing on - a disruption in a discussion based classroom is quite different from a quiet, individual work environment	Further research on relationships between environments and disruptive behaviours. This is done in 1.2.1. Shouting in the playground when doing sports is appropriate. However, it is inappropriate in the classroom. So the disruptive behaviour is dependent on the environment. Problem scope should be more specific about what environment it is. Furthermore, from the qualitative interview, it was found that the "*transition time*", when students enter the classroom after breaktime, is most disruptive. This focus area and environment will be further investigated in future.

According to the feedback and solutions that we had, a future plan was listed as follows, to be completed before the next milestone (Interim Project Critique):

- Further research other modes of communicating with students apart from voice (eg: visual, integration of technologies such as smart screen)

- Determine if there are any possible solutions to deal with the most common disruptive behaviours - such as students that ‘talk out of turn’
- Figure out how to deal with potential biassed problems
- Narrow down the problem scope to focus on a specific environment and classroom context
- Narrow down the user group to a specific group of primary school users

Milestone 2: Interim Project Critique

Table C: Task allocation during Milestone 2

Name	**Task allocation**
Kai	• Team reflection part • More research on stakeholders • Digital sketch for current concept
Martin	• More research on stakeholders • Refine conceptual model • Presentation
Amelia	• Refine conceptual model • Concept sketches for testing • Develop user testing plan • Conduct interview • Analyse interviews • Sketch storyboard • Presentation
Weirui (Chris)	• Research on current solutions for transition times • Presentation
Michelle	• More interviews • Research on child psychology with transition time (from visual and music aspects) • Reflection part
Krista	• Research into transition times • Refine conceptual model

Table D: Feedback received in preparation for Interim Critique and their corresponding solutions.

Tutor Feedback	**Solutions**
Explore a specific environment and	Focused our problem space to specifically

classroom context	target student disruptions during transition times
Transition times	Shifted focus area from general behaviour management to transition times
Child psychology	We did further research and implemented this into our solution space from both visual and music aspects (see Section 1.5)
Refined target audience	Younger students need more collaborative engagement - this was incorporated through concept movement breaks and a younger target audience of Prep - Year 2 classrooms was selected and supported through user studies
Considering different teaching models	Integrated current techniques used during transition times into our solution design, particularly that of calming music and transition time activities in phase 2 of the concept

Table E: Feedback received in Interim Critique presentation and their corresponding solutions.

Feedback	**Response**
Hi-fi may not help. Could use body-storming or something interactive instead — paper, interactive movie, showing the animal emoting, etc. → interactive experience prototyping	We may consider using paper prototyping to do interactive testing with target users in following user studies. We will also design several example videos showcasing the intended concept flow.
How will the current solution not be a distraction in and of itself?	Currently our solution aims to be like a role model to provide instruction and create a routine. Focus on transition times only (once the lesson starts, the system will be idle - solution only used during 10-15 minute transitions)

How will the type of avatar affect kids and the type of role model?	We will need to test kids' response to the current type of role model proposed, which is an animated classroom pet, and determine if this is indeed effective in comparison to a human avatar or some other form. One successful interview was conducted with a target child user.
Have you interviewed stakeholder groups such as parents or teachers, or learning resources developers regarding the impact of such a solution with such content on the learning & early childhood development process?	Stakeholder groups, such as teachers, have been interviewed regarding transition times and our proposed concept solution. They expressed fairly positive feedback on our solution's likely effectiveness for students to be able to take ownership of the transition period, be assisted and encouraged to settle into class, and develop a routine (see Section 4.1.3). Nonetheless, user research can still be conducted to further determine the impacts that such a solution can have on learning and development of young children.
Consider different ways that people interact with the solution - by conducting some interactive testing, you could look at how kids want to interact with it and build that into your solution.	We may consider creating a paper prototype or other form of interactive prototype that can allow users to freely interact with the concept, and we will conduct user research to observe how they may naturally want to interact with such a technology. Interviews were later conducted.

As we continue our investigations into the problem space and solution, we seek to do further research into what specific movement breaks could be targeted with our solution, through displaying an example Movement Break table, and what visual information would be effective to use and display for our target group. This will involve further desk and user research. We also aim to design a high-fidelity prototype and storyboards to use in our user studies, to show interviewees and get feedback. We will then evaluate the user testing, and determine how the findings can further inform our concept, which we will continue to refine. We will keep updating our report and prepare for the exhibit and final submission.

Milestone 3: Exhibit

Table F: Task allocation during Milestone 3

Name	**Task allocation**

Kai	• Sketch of sleeping tiger • Questions/Areas of Investigation • Team reflection part • Video of Timmy tiger example • Final Prototype sketches
Martin	• Refine conceptual model • Presentation slides • Happy tiger sketch • Success Criteria
Amelia	• Upset tiger sketch • User testing plan • Interview with teacher • Interview with child user • Presentation slides • Research poster • Questions/Areas of Investigation • Refine background research • Overview • Movement Break Example Table
Weirui (Chris)	• Refine project plan for the final report • Presentation slides • Stretching tiger sketch
Michelle	• Role model sketches of the tiger and boy • User testing plan • User testing analysis • Design process poster • Ethical considerations
Krista	• Sketch of person stretching/yoga with music • Refine stakeholders part • Prototype poster • Prototype video • Refine background research

5.2 Risk Management

Risk management is important to a project's success. A risk assessment matrix was generated for potential risks. When assessing a potential risk, the following aspects will be

considered: risk likelihood (probability of the risk), risk severity (the impact of the risk), solution (method to avoid the risk).

Table G: Risk Assessment Matrix

Risk Description	**Risk Likelihood**	**Risk severity**	**Solution**
Data Collection: As the main target audience constitutes school students, there may be several problems that arise when collecting data with this sample group. Students may not cooperate during the interviews and there may be difficulties in accessing a sufficient number of target users.	Medium	High	Alternative methods would be getting data by using a probe/observation as well as finding and accessing sufficient users well in advance. Prior permission is required when collecting data from children.
Unfamiliarity with Hardware/Speech Recognition Technology: The problem/solution scope asks for a high requirement of knowledge surrounding interaction with hardware/speech recognition technology	Medium	Low	Further research on interaction with hardware/speech recognition technology will be conducted.

6.0 Questions/Areas of Investigation

Through extensive research, prototype iterations, conceptual model design and thorough user studies, the team has effectively identified and examined many important aspects of the problem space and solution space in the design and development of the proposed *CalmaPet* prototype. During this iterative design process, many key questions have been explored, however, there are several remaining questions and further areas of investigation within the problem space of Disruptive Classroom Transition Times that are required in order to advance the design process and learn more about the effectiveness of the proposed solution and its impact on stakeholders and target students. There are also several key activities that will be required by the Build team in order to acquire this essential knowledge.

In terms of further research, there are several gaps in knowledge within this problem and solution space. The gaps in knowledge include affordability, potential classroom distractions arising from smart screen output, target age group engagement, and various uncertainties with the device's output and transition time activity content. For each, there are several potential investigation activities that can be undertaken to make an accurate conclusion that can support design decisions for the device, in particular the device's output. These include user observations with students in Prep, Year 1 and Year 2, interviews with school leaders and parents and in-depth literature research on the specific nature of classroom transition times and the level of student engagement in the physical classroom when the prototype is in use. In addition, further research is needed to investigate how a classroom layout affects transition time effectiveness as well as how the COVID-19 pandemic has affected learning processes, student behaviour and teaching engagement when it comes to the many transitions throughout the school day.

Another area of further exploration that is needed, includes better understanding the nature of the different types or categories of transitions throughout the school day and examining the three main types of transitions - which include entering the class, changing from one learning activity to another as well as exiting class, such as when students leave to special classes or sport events. This is a crucial area for further investigation and will significantly inform the future needs and device complexity of the *CalmaPet* prototype. Transition times are a very complex and broad subject matter and thus, more extensive research and user studies are most necessary. Conducting qualitative interviews, in-depth contextual inquiry, participatory design and design workshops as well as school site observations and educator focus groups will be most insightful in identifying the intricate needs and expectations of key stakeholders when it comes to the complex nature of classroom transition times in early primary school students.

Other questions, activities and areas of investigation largely revolve around refining and further deepening on the focus area of classroom transition times and include:

- What are some more detailed and specific examples of movement break activities that will best calm down students and effectively assist in them transitioning to prepare for learning? Conduct quality user testing evaluations of each movement break activity with a group of target students.
- Could schools afford this technology? The device may need to be installed in multiple classrooms and may involve expensive materials such as microphones and computer chips. To investigate this issue, research into schools' budgets must be undertaken, including surveys and interviews. A product cost calculation, based on materials and estimated manufacturing cost, will also need to be done to determine if the price is within feasible budget.
- Could this device be used to record meaningful data in order to display trends in disruptions and quantitatively showcase transition time effectiveness? Conduct interviews with school leaders and school stakeholders to determine if this is a relevant avenue to take.
- User research observing how students react to the classroom pet mimicking emotion will need to be conducted. Research should also be linked back to the other area of investigation assessing if the solution may cause unintended distractions in the classroom. The investigation should involve literature research, surveying and interviews.
- Conduct more user testing and interviews with children in the target user group of 5-7 year olds to determine the effectiveness of the solution in calming disruptions and providing engaging and meaningful transition time activities.

7.0 Team Reflection

7.1 Project Direction

In Week 4, we were given our teams, which consisted of 3 internal members and 2 external members. We had initially chosen to tackle the problem space of disruptive behaviours, although throughout this semester we have gradually tweaked the problem space and solution space. In Week 5 we chose our solution to be a smart speaker noise level monitoring system although, with the feedback in Week 7 from the Interim Project Critique, we received valuable criticism within our solution space and problem space. The solution space had fundamental issues, such as the children perhaps being able to gamify the speaker, as well as the contradictions within our research and solution. From this feedback we had a discussion with the tutors and chose to narrow our problem space to solve disruptive behaviours during transition times for prep to grade 2 students, which was initially raised in user interviews. With this new direction for the problem space, we decided to go with a new solution space which encourages better behaviour through a mix of activities, music and role modelling through a digital “classroom pet”. This better correlates with the information research in the report. At this point, we planned to refine our idea with feedback from the Week 8 team presentation, as well as suggestions raised in user studies. In Week 9 we decided with the solution we have made with research and the initial user studies, we needed a third round of testing to validate our solution. From the user studies, we were able to validate our current solution, and started to create the final sketches and designs. After the exhibit, we are now starting to discuss what are the next steps for our project.

Summary of project direction since Week 4

Week	**Project Direction**
Week 4	• Chosen to focus on disruptive behaviours in schools
Week 5	• Specified on disruptive behaviours and verbal noises disruptions • Chose our solution space to use smart speakers to pick up on noise disruption
Week 6	• We chose to narrow our target use case to be early primary school from prep - year 2
Week 7	• We received feedback from Interim critique about the system • We chose to head in a new direction involving more child psychology and how discipline works on them
Mid-Sem break	• Narrow our problem space to be targeting student disruption during transition times • Our solution using established methods such as transition activities and emotional encouragement to maximise output

Week 9	• We chose to do user testing to validate our solution
Week 11	• Finalise the solution • Finalise movement break activity examples
Week 13	• What are the future directions of the project?

7.2 Team Process

Initially, we established a team charter to set our standards and ensure that we could all be on the same page as to how we would conduct ourselves as a team (see Appendix 10.4 for team charter). We established our weekly meeting times, how we would communicate, conflict resolution strategies, and our work management. Doing this set a good initial foundation for our team.

Throughout the progression of our project, our general process has typically been as follows: having a team meeting during studio sessions, doing assigned work individually, having an additional team meeting during the week, then doing assigned work, and repeat. Thus far, this process has worked quite effectively for us. Throughout the project, we have been meeting as a team via Discord, and have had a shared Google Drive to work collaboratively.

Studio Sessions

During our studio sessions, we usually have discussions as a team and seek feedback and help from tutors. We don't typically do an extensive amount of work individually during this time, but spend it having conversations around what we have done and need to do, and clarifying any questions we have with one another and our tutor. We then plan all the tasks we need to complete until our next meeting time and allocate these tasks amongst team members. We then schedule our next meeting and establish a general plan for it. Though we have scheduled a time in our charter, we often have to check this with everyone weekly due to shifting personal timetables. Between the studio session and next team meeting, we each then work individually on what has been delegated to us.

Second Weekly Meeting

Throughout our second weekly meeting, it follows a similar process. We often start by each reporting back our individual progress. The majority of our meeting is then spent in discussion. Often this involves conversations prompted by the report backs, any feedback we have received and need to address, and the specific topics we had planned to discuss. We then plan what needs to be done next and assign tasks to each person. We have no strict process for task allocation, but rather just volunteer to do particular tasks, though still

ensuring each person contributes fairly equally. Otherwise when a task is delegated specifically to someone, it is often because they previously worked on it and need to revise and/or add to it. We then schedule an additional meeting prior to the studio if needed, and then develop a general plan for the next meeting. All key meeting notes are recorded each week in the Team Meeting Log (see Appendix 10.10) and posted on the team's Discord.

Assessment

In regards to assessment deadlines, we established in the beginning that we would aim to each complete our parts 2 days prior to the due date. Since the project is team-based and we are depending on one another, setting an earlier deadline would help us to work against having late submissions. It would also reduce the stress that comes with waiting on last minute completions and submissions right before deadlines. During those final 2 days, we can just focus on final proofreads and minor edits, and submitting the assessment. So far, this has been beneficial for our team as it motivates everyone to try and be more time and work efficient to complete everything early.

All in all, we have been able to work effectively and cohesively as a team unit. Everyone has been very collaborative, demonstrating an openness to different ideas, perspectives, and critiques, with nobody holding too firmly onto individual ideas, but being very considerate and open to what is best for the team and project, and/or what the majority agrees on. We have had no arguments or major conflicts as a team, and have often agreed on most things. We have been able to communicate fairly well both in and out of meetings, with everyone contributing to conversations.

Team Angry Emoji

Despite the challenges that often come with working in a hybrid mode of internal and external students, our team experience thus far has been good. This can be attributed to everyone's willingness to be a team player and have an active role in the project. We also received a new team member midway through our project, which often has the potential to pose some challenges on the team as a whole and its individual members. However, collectively for everyone as a whole, it has been a positive experience and we have not experienced any complications or concerns thus far. From the perspective of previously existing members, we believe they are a great new addition and fit right into the team. From the individual perspective of the new team member: *"Generally speaking, joining team angry emoji was a very positive experience. I slipped into the team smoothly and found the problem space and proposed solutions very interesting. The only real challenge I faced was feeling hesitant to make drastic alterations to the work or ideas that had already been implemented, however, the openness of team discussions and the positive feedback I received from my teammates made this easy to quickly overcome"* (Krista, Internal).

We have also tried to stay quite organised with our project management, which has helped us to work more efficiently as a unit. We plan our meetings and tasks, meet at least once, if not twice a week, have a shared digital workspace as a team, and keep weekly meeting logs to track our progress (Appendix 10.10). Everyone understands the expectation to put in the effort and do our individual parts for the team, which has helped us thus far to work together successfully as part of Team 😡.

7.3 Exhibit Reflection

In Week 13 we had our exhibit, where we showed all of the progress of our project up to the current and final iteration. This took the form of a trade show style exhibit where we had our research, design process and our product and prototypes. For this exhibit we fully leaned into our project's identity of our jungle-based mascot “Timmy the Tiger”, making our exhibit very themed. For the exhibit presentation, we had our internal members present the brief, then everyone joined in for the discussion.

As we believe we were well prepared, the presentation went swimmingly for us and we could not be happier. Throughout the exhibition, we had plenty of people drop by our exhibit, where they were eager to listen about our project and the processes we went through to make it. We also took turns and went around viewing other peoples projects and hearing the journeys it took them to get to this point. Although it was a long four hours, it was great to see what every team chose to do. Overall, it was an enriching experience showcasing our proposed prototype, *CalmaPet: The Digital Classroom Pet.* The link for our exhibition slides and video can be found here.

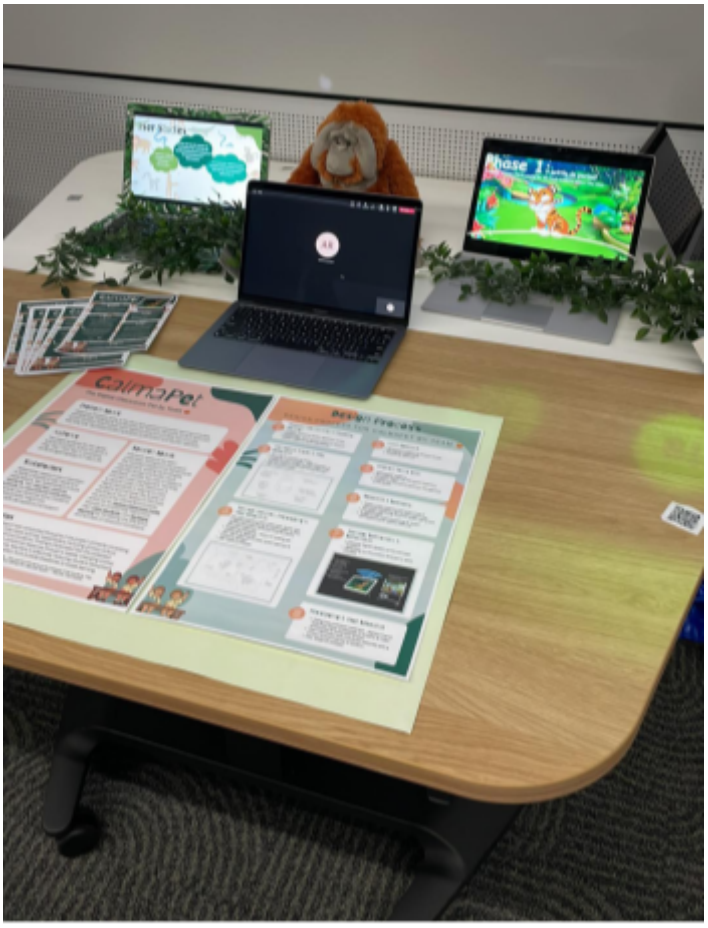


Figure 11 - Photo of the exhibit set up

Figure 12 - Posters used for the exhibition (Appendix 10.17)

During the exhibition presentation, one of the tutors asked “Could this be used to track and analyse data?”, and our current response would be, “We have had discussions about this early in our project, although implementing this feature would have required a lot more user studies and testing than we had time for”, and thus would be a perfect starter for the future of this project. From this point forward, the next steps would be to create a bigger list of movement breaks and then incorporate all of this into the first initial *CalmaPet* functional prototype. It would be amazing to conduct and see a full scale user test on an entire class with the functional prototype to validate our model at a large scale.

8.0 Conclusion

Our research into disruptive student behaviour and disruptive classroom transition times has found that problematic student behaviour heavily impacts the processes, quality and outcomes of Australian school education for students, teachers and all stakeholders involved. Transition times are commonly known to be when disruptions occur often for the grades prep to grade 2. Current management interventions provide short-term relief to this growing challenge and take up excessive teaching efforts and staff resources, focussing heavily on the negative aspects of individual actions. Therefore, helping students to regulate their disruptions and settle down after lunch breaks by using current teaching models integrated into a smart solution, has been concluded to be most effective in creating productive classroom environments in the long-term.

Our proposed solution, *CalmaPet: The Digital Classroom Pet,* will positively benefit classroom processes by integrating technology to encourage students to reduce noise disruptions. *CalmaPet* will be integrated into a smart device to orchestrate a two-phase programme, the “settle-in-period” and the “transition movement break”, to allow for the students to be better focused during these transition periods. The “settle-in-period” phase will have the digital pet, programmed with emotions to encourage good behaviour. The “transition movement break” phase is where the student will do a themed activity, run by the virtual character on the smart screen, such as ‘sing-along with Timmy the Tiger’ and ‘stretching like a tiger’, in the goal to engage and calm down the students. This solution incorporates the research and previous solution into a package which will ultimately aim to ensure every child receives the best quality education by reducing in-class disruptions.

As the proposal project comes to an end, there are several key areas where further research is required. Future research will likely also include school budgetary restraints and how stakeholders will play into the design of the solution. Additionally, research on the most suitable way of delivering transition time activities will be conducted to ensure the solution is engaging and effective for target students. For future Build teams that will tackle our project, you will need to create working prototypes and conduct full scale classroom testing to validate and gain real world feedback on the functionality of *CalmaPet*. With further prototyping and research, the solution will be bound to change to tackle the problem space, most effectively, and work towards ensuring every classroom is supported and empowered to learn every day.

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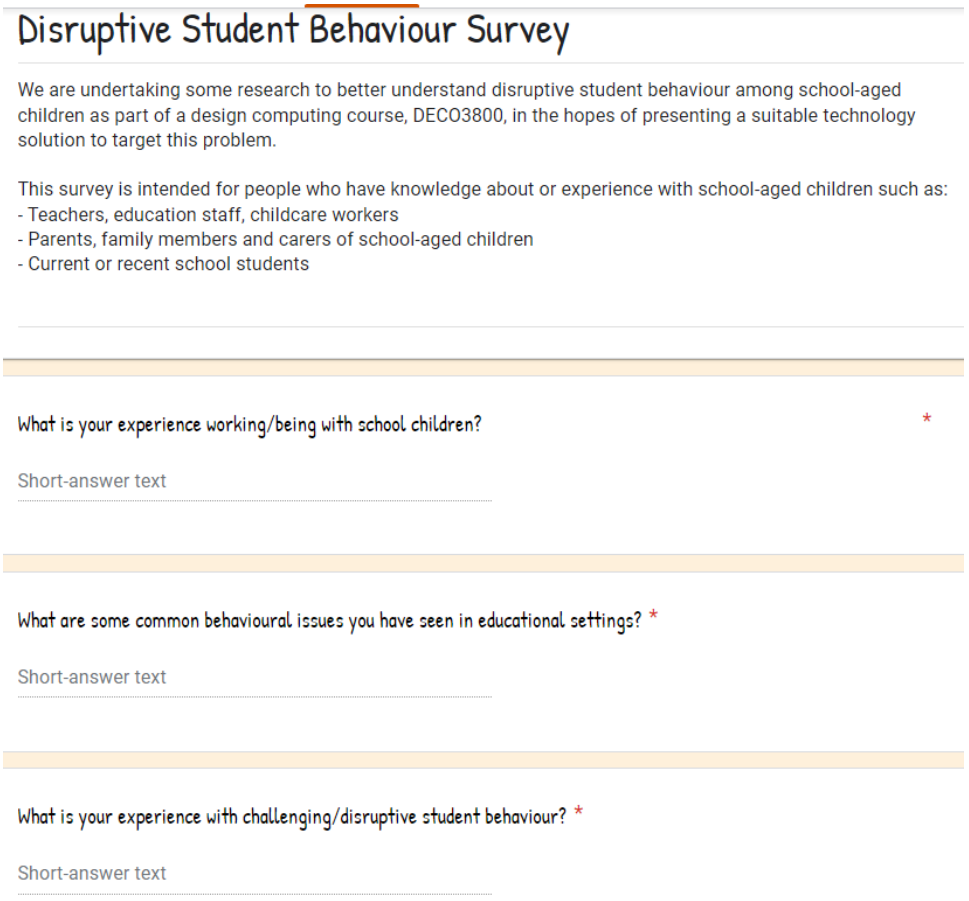
10.0 Appendices

10.1 Stakeholder Survey

The following online Google survey was conducted with key stakeholders.

Survey Link: https://forms.gle/ssuTVNpQa2dD2kVf9



Disruptive Student Behaviour Survey

We are undertaking some research to better understand disruptive student behaviour among school-aged children as part of a design computing course, DECO3800, in the hopes of presenting a suitable technology solution to target this problem.

This survey is intended for people who have knowledge about or experience with school-aged children such as:
- Teachers, education staff, childcare workers
- Parents, family members and carers of school-aged children
- Current or recent school students

What is your experience working/being with school children? *

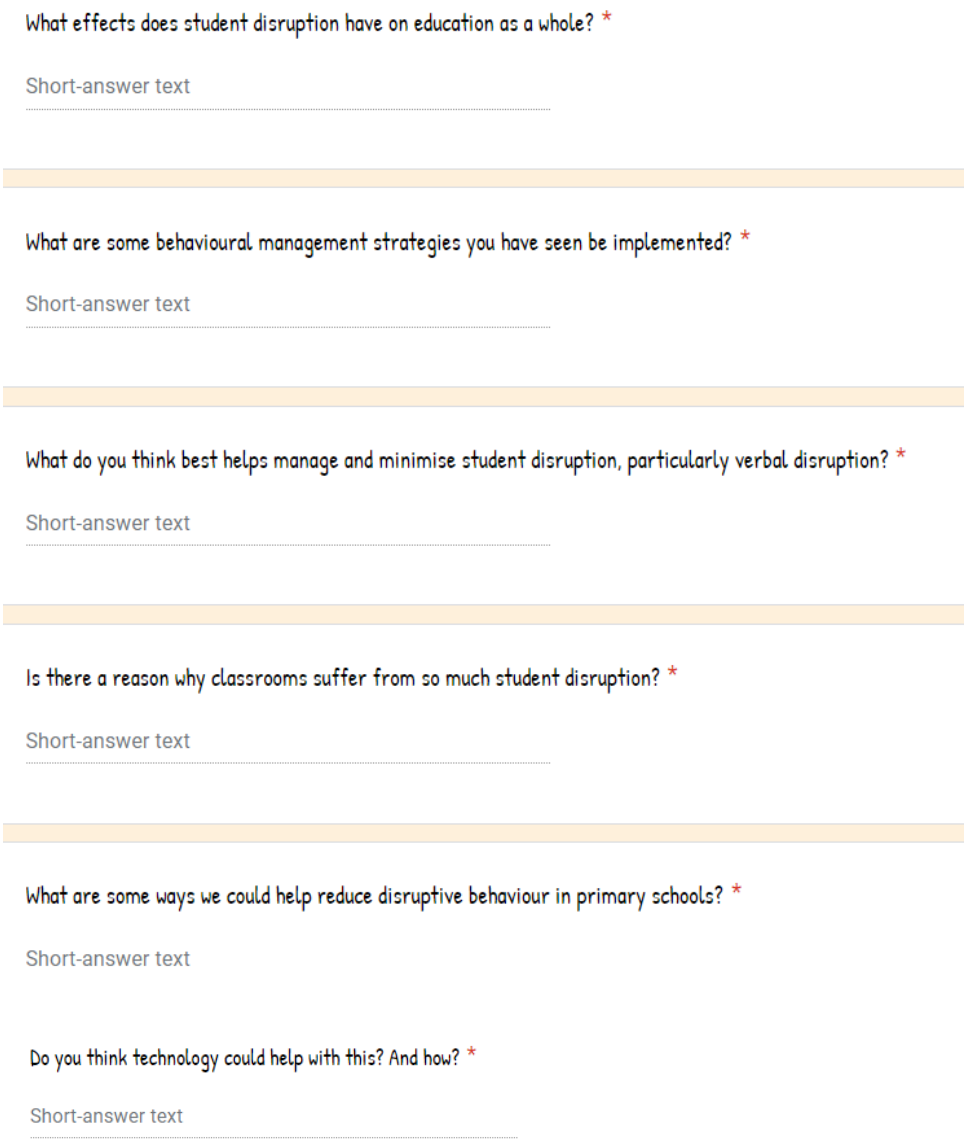
Short-answer text

What are some common behavioural issues you have seen in educational settings? *

Short-answer text

What is your experience with challenging/disruptive student behaviour? *

Short-answer text



Survey Questions

The following raw data and results were collected from the survey:

What is your experience working/being with school children?

School Teacher and parent

caring for children at schools and in classes

What are some common behavioural issues you have seen in educational settings?

Calling out in class, tantrums, not following instructions, disrespectful behaviour, shouting, swearing

rude behaviour including shouting and yelling as well as bullying and distracting others

What is your experience with challenging/disruptive student behaviour?2 responses

Preventing and managing disruptive student behaviour in class

it's frustrating and causes other students to also misbehave

What effects does student disruption have on education as a whole?

Interferes with the teaching and the learning

it limits the quality and level of education and students fall behind

What are some behavioural management strategies you have seen be implemented?

Establishing expectations ie what is acceptable/unacceptable behaviour and consequences, being consistent with rules, focusing on positive behaviour and encouragement

positive discipline is a good one

What do you think best helps manage and minimise student disruption, particularly verbal disruption?

Being consistent and following through with rules , engaging lessons

being kind and not negative - encouraging kids to make good choices and making learning fun

Is there a reason why classrooms suffer from so much student disruption?2 responses

Learning issues, lesson too easy or too hard, personal and family issues, behaviour issues

I think students are bored and they don't know any better - they need support

What are some ways we could help reduce disruptive behaviour in primary schools?

Engaging lessons, routine, knowing your students (likes, dislikes, needs), mutual respect, prais and support, give student a choice

supporting kids positively and helping them to feel good at school

Do you think technology could help with this? And how?

Yes to a degree, eg , make lessons interesting and engaging by using laptops or other devices, using audio and visual instruction on a screen

it could be really helpful supporting students somehow to manage their actions and not distract others

10.2 Initial Stakeholder Interview

The following qualitative interview was conducted with a teacher stakeholder.

General Interview Questions:

What is your role or experience working with school students?

What do you know about disruptive student behaviour? What is it? What does it look like?

What are some causes of disruptive student behaviour in your opinion?

What impact does disruptive behaviour have as a whole?

How is disruptive behaviour managed in the classroom? What works and what doesn't?

What are some barriers to reducing disruptive student behaviour?

What do you think is needed to help with this problem?

What is your experience with the level of noise in the classroom? What causes it and what consequences does a noisy class have?

What are some strategies to help reduce student disruption and classroom noise?

How do you think technology could help tackle this problem?

What do you think of technology used in this space?

Initial Solution User Evaluation Questions (showing initial paper prototype designs):

What do you think of this solution?

What aspects are effective? What aspects are not so effective in managing student disruption and reducing classroom noise?

Do you think this product would integrate well with the classroom?

Do you think voice prompts and audio will be effective outputs to alert the class of its noise disruption level? What other features could be used?

How would you improve this design? What about the look and features?

10.3 Initial Interview Raw Data

RESPONDENT 1: Primary School (Y Prep-6) and Special Education (SEP) Teacher

General Interview Questions:

What is your role or experience working with school students?

My role working with students is working in different classrooms from prep to year 6. I've also done some work with special needs students which are those who may have some special needs, whether it's anxiety, autism and other behaviour management conditions. It's quite a challenging area. Some percentage of students in each classroom also have extra needs which need to be catered for through extra support.

What do you know about disruptive student behaviour? What is it?
Disruptive behaviour is behaviour that disrupts the learning of the students in the classroom and also the teachers teaching as well as the routine of the classroom. So anything that stops the teaching, learning and routine in the classroom and is disrespectful to other students is disruptive in my opinion.

What does it look like?
Disruptive behaviour has many forms. It could be loud like calling out in class. It could involve disrespectful behaviour, anger or actions like shouting or being rude basically. It could basically be anything that stops the class. It could be loud, a student not doing or following instructions. Usually disruptive is visible to the class.

What are some causes of disruptive student behaviour in your opinion?
The causes of them come down to the child not having a need met. So you need to find what is the need, what are the needs of that child that are not being met. It could be a number of causes like simply the child not having breakfast, getting enough sleep the night before or having a family problem before they arrived at school. Or it could be that they are feeling sick, have a headache or are even hungry or thirsty - basic biological needs. On another level, it could be because the child is not engaged in the learning in the classroom, for many reasons - the learning may be too hard for them and they don't understand what is happening and become disruptive or it could be too boring, too easy for them and they don't want to participate. The learning needs to be at the right level for the child so the child is challenged but not too much so it's not hard. It could also be that they had a friendship issue and aren't getting along with others in the class. It could be educational, social, mental, family or health reasons. There's a lot of different reasons that cause disruptive behaviour. It's not that straightforward.

What impact does disruptive behaviour have?

It has a lot of impacts. The impacts are far-reaching. It has an impact on the students themselves, the student doesn't learn what's needed for their education and life as well as social skills. On a wider level it impacts the other students in the classroom as they also have their learning disrupted because time is taken away from learning. On a wider level again it impacts society as a whole ultimately, because as that student matures it affects their career opportunities, the way they live their lives in their families, relationships and their effect on society. So it can even have far-reaching effects including negative behaviours in society. The sooner this disruptive behaviour is analysed and supported by the teacher, the better off the student is, the better off the other students are and the better off society is. So everyone benefits. Only through quality education can children thrive and truly develop to benefit society.

How is disruptive behaviour managed in the classroom? What works and what doesn't?

In the classroom, unfortunately in some classes the disruptive behaviour is not managed well. And children are not respected and their bad qualities are highlighted and there's a lot of detentions and punishments that follow. This hasn't been working very well in my opinion. I have seen classrooms where the disruptive behaviour is managed well. These classrooms focus on positive discipline. They focus on the good qualities and positive attributes of every student. These classrooms praise and support students and highlight each student's positive attributes, because every student has gifts - some are stronger in art, some in science or music. What does not work is focussing on a child's negative attributes. What works is allowing the child to learn in a positive environment.

What are some barriers to reducing disruptive student behaviour?

Barriers include limited resources and the classroom teachers and school culture. The teacher has to be open-minded and focus on the positive. There are many teachers with old-fashioned views that date back to when students were even caned in schools. This culture of punishment in schools is still alive today but is not as visible. The focus sometimes is on negative attributes instead of positive attributes.

What do you think is needed to help with this problem?

I think there needs to be a shift in focus to looking at a child's good qualities, their strengths and even small achievements. If a student does one thing right all day, then that one thing should be highlighted as that would encourage the student to do the right thing. Education also needs to be at the right level for the student too.

What is your experience with the level of noise in the classroom? What causes it and what consequences does a noisy class have?

With classroom noise, noise level differs according to what's happening. If the teacher is teaching, the students should be listening. But if there's group work and the class is divided into activities there will be a level of noise. It depends on the activity. Is the teacher teaching, are there group activities, or are students working independently. There are different noise levels according to what learning activity is taking place in the session. I feel that a classroom should not be fully silent unless there is some special activity. A healthy classroom has healthy conversation through peer learning. This is good. Of course, the level of noise should be inside voices, that means the students voices should not be at a loud level like shouting which sometimes happens when a student becomes upset or angry and they haven't learnt to manage their emotions in a mature way. In those situations the teacher steps in and may take the student aside and help them to calm down. The impacts of a very noisy class make the learning hard to focus on. You can't even talk or hear anything so learning almost stops for everyone. The noise level should only be zero, low or moderate depending on the type of lesson happening.

What are some strategies to help reduce student disruption and classroom noise?
At the beginning of the lesson or day, you explain and set expectations about noise levels, such as whispering or quiet voices. You also tell them the consequences, such as a warning if your noise level increases, then you get a second warning and a third being to go and sit in the corner and calm down.

How do you think technology could help tackle this problem?
There's many ways technology could help noise level and disruption. I think there's ways that haven't been discovered yet. I think it's a really good way, probably some ways could be if there was something that could help relax a child that was angry. For the whole class I think because we have interactive whiteboards and big screens, some quiet music when the students come in from breaks. When students first arrive the noise level is high for 10-15 minutes until their bodies calm down from physical activity from outside and the oval. But when they come back in the transition time between the break and the lesson - we call this the transition time and that transition time is a noisy and disruptive time of day. There's at least two of those transition times, and another being when they first arrive at school. The noise level is quite high too. That would be a really good time if there was something that would help students and the whole class to calm down and get ready for learning in the classroom. Because they are only children they can't suddenly calm down. Some teachers do silent reading for 10 minutes and even during that a lot of kids find it hard to be quiet, they keep talking. I think music and technology would be helpful to calm down.

What do you think of technology used in this space?
I think technology and the right type of solution that helps students would be very calming and help students transition from outside breaktime to inside learning. It's one of the hardest

times of day. During this time the teacher is busy attending to student problems and it's hard to also attend to the whole class and calm disruptions.

Initial Solution User Evaluation Questions (showing initial paper prototype designs):

What do you think of this solution?

I think it's actually such a fantastic idea. The reason for that is that there is disruptive behaviour that needs to be attended to - this will help the teacher so the teacher has more time for actually teaching then wasting it on disruptive behaviour, the second reason is that students really get engaged and love technology. And so to mix and use technology to reduce disruptive behaviour is actually one of the best solutions I've heard and i would actually support and even get one of these for my classroom.

What aspects are effective? What aspects are not so effective in managing student disruption and reducing classroom noise?

I love the noise level measure which reminds the students of what the noise level in the classroom is so they can then either reduce or stop. I also love that lights and visual and voice prompts are used as that also engages students. The device though does not look that fun or exciting - maybe if it had a different shape or the structure or design could be different - maybe have a character or something. I do like how the teacher's voice is recognised so if they need to speak a little louder it does not affect - as sometimes the teacher needs to project their voice.

Do you think this product would integrate well with the classroom?

Yes it definitely would as a classroom today has laptops and smart screens, sometimes ipads and this would definitely integrate well.

Do you think voice prompts and audio will be effective outputs to alert the class of its noise disruption level? What other features could be used?

I think voice prompts would be excellent - it would save the teacher's voice even. Lights are really good. I think the smart screen could be used if it isn't being used for teaching - it could be used in some way as well - maybe connect to the screen in the classroom and show some sort of visual prompt like a character or a scene from nature or something the kids are interested in that would get their attention and help to remind them to stay focussed.

How would you improve this design? What about the look and features?

I feel it could have more vibrant colours and be a character. Maybe the character it comes in could also go on the screen or there could be a family of characters. Maybe some sort of little 60 second game to help the kids or challenge for the transition time or a five minute silent challenge and the noise level measure will see if the class can get points for five minutes of quiet time when they first come in and they could get classroom points for today and the week and the teacher could give a reward to the class if they met the points. Then the

students have an incentive to work towards reducing disruptions. That would work well with the teacher and the device working in a team and together they achieve reduced disruption. In a way it's like a mini assistant of the teacher - almost a teacher assistant which really helps the whole learning process - it's a win win, students win by engaging with the device and getting rewarded, teacher wins through less disruption and more learning. Also setting a custom noise level for different activities.

Do you have any further comments?
I would love to get this if it was available! There is a big gap in education with these types of technological devices, it’s a much needed product that's not really out there yet. There's a definite need and market for such a solution.

10.4 DECO3800 Team Charter

The following team charter was created by Team 😡 for DECO3800, detailing course and team processes, details and expectations for the project and semester.

Team Name: 😡 [Angry emoji]

Team Members:

Name	Student No.	Email/s	Discord/Other
Amelia Rowhani	45820937	amelia.rowhani@uqconnect.edu.au	ameliaro#6002
Martin Baer	46416814	martinrbaer@gmail.com	Marty#7869
Weirui (Chris) Zhang	45581500	weirui.zhang@uqconnect.edu.au	Weirui(Chris) Zhang#5141
Kai Barry	46405788	k.barry1@uqconnect.edu.au	BOBJohnson#5476
Michelle Cheng	44802981	m.cheng1@uqconnect.edu.au	michellecheng#4356
Krista Bradshaw	45285143	kristabradshaw@hotmail.com	krista-b#4224

Team Meeting:

- Weekly Meeting Time: Tuesday Studio (10-2pm)
- Additional Meeting: Friday 6:00pm / Thursday 7:30pm-8pm
- Team agrees to: Give sufficient notice of not being able to make meetings when able

Team Communication:

- Communication Channel: Messenger, Discord

- Communication Response Time: 24 hours
- Team agrees to: communicate openly

Responding to messages and emails

How often should we check messages and emails?

Messages

Emails

When assessments are due should we check more often?

Communication response time (see 6)

Problems or Disagreements

What should we do if we have a problem with another team member's behaviour or work?

We will discuss any issues and vote by majority if needed

Major issues brought to the attention of tutors.

Work Management & Deadlines

Completing assessment *2 days* prior to submission deadline to be ready for submission early.

Members contribute equally to the project and complete assigned tasks in a timely manner and to the best of their ability.

Signed and Accepted

Kai Barry

Martin Baer

Amelia Rowhani

Michelle Cheng

Weirui Zhang

Krista Bradshaw

10.5 User Personas Full Image and Text

Jimmy

Job Title
Prep Student

Age
4

Bio

Jimmy is a Prep Student and is currently 5 years old. He often gets angry with teachers when they tell him to move to another activity and to stop talking about what he just did in the playground at lunch break. This is because Jimmy feels as though he is not finished with his current activity yet - he does not feel settled in the classroom after coming back from lunch breaks. He wants to finish his current activity and he feels he has not been given proper warning for when he has to move on and prepare for learning. This makes him angry and Jimmy usually starts screaming, yelling and causing other students to become distracted too.

Goals

- Wants to fully finish every activity
- Wants to enjoy school
- Wants to have fun and play with friends

Frustrations

- When the teacher tells him to move on
- When the teacher doesn't give him a proper warning
- Gets angry and embarrassed when he doesn't get to finish his activity

Name:

Jimmy

JobTitle:

Kindergarten Student

Age:

4

Bio:

Jimmy is a Prep Student and is currently 5 years old. He often gets angry with teachers when they tell him to move to another activity and to stop talking about what he just did in the playground at lunch break. This is because Jimmy feels as though he is not finished with his current activity yet - he does not feel settled in the classroom after coming back from lunch breaks. He wants to finish his current activity and he feels he has not been given proper warning for when he has to move on and prepare for learning. This makes him angry and Jimmy usually starts screaming, yelling and causing other students to become distracted too.

Goals:

- Wants to fully finish every activity
- Wants to enjoy school
- Wants to have fun and play with friends

Frustrations:

- When the teacher tells him to move on
- When the teacher doesn't give him a proper warning
- Gets angry and embarrassed when he doesn't get to finish his activity

Leah

Job Title
Year 2 Student

Age
7

Bio

Leah is a School Student currently in Year 2. Leah is a hard working student, although struggles to focus when moving from one activity to another. She often finds herself not handling this transition well and often distracted. She wishes that the school would ease from one activity to another activity.

Goals

- She wishes to be focused on each activity
- She wants to be eased into an activity
- She wants to be more prepared for the transition

Frustration

- Transitioning from one activity to another feels abrupt

Name:

Leah

JobTitle:

Primary School Student

Age:

9

Bio:

Old

Leah is a Primary School Student currently in Grade 3. She has been studying hard at school. Although this year her teachers are great, her class is filled with noisy students, who talk persistently throughout class. Her teacher is extremely kind and leaves the disruptive behaviour unchecked, allowing the noisy students to keep talking and giggling. Due to the noise, Leah struggles to learn and concentrate in the classroom.

New

Leah is a School Student currently in Year 2. Leah is a hard working student, although struggles to focus when moving from one activity to another. She often finds herself not handling this transition well and often distracted. She wishes that the school would ease from one activity to another activity.

Goals:

Old

- She wants to get straight A's this year
- She wants to be friendly to all her classmates
- She wants to be able to focus on the learning at hand

New

- She wishes to be focused on each activity
- She wants to be eased into an activity
- She wants to be more prepared for the transition

Frustrations:

Old

- The learning environment is loud and she struggles to listen to her teacher

New

- Transitioning from one activity to another feels abrupt

Alison

Job Title
English Teacher

Age
65

Bio

Alison has worked as an English Teacher for the last 35 years. She has always loved teaching, but is mentally exhausted and tired from the increase in disruptive student behaviour and she finds it hard to manage distractions during transition times. She is thinking of retiring in the next couple of years. In class, she struggles to handle students who enter the classroom disruptive and noisy after lunch breaks, and Alison finds it hard to effectively tell the students to be quiet. She has asked for assistance, however the school cannot afford a teaching assistant.

Goals

- Be able to teach her class with the students engaged and focussed
- Make all her students like her and listen to her instructions
- Help students develop and succeed academically

Frustrations

- Not having the means to effectively tell students to be quiet
- Getting tired and exhausted from students not listening to her commands

Name:

Alison

JobTitle:

English Teacher

Age:

65

Bio:

Old

Alison has worked as an English Teacher for the last 35 years. She has always loved teaching, but is mentally exhausted and tired from the increase in disruptive student behaviour. She is thinking of retiring in the next couple of years. In class, she struggles to handle students who are disruptive and noisy, and finds it hard to effectively tell the students to be quiet. She has asked for assistance, however the school cannot afford a teaching assistant.

New

Alison has worked as an English Teacher for the last 35 years. She has always loved teaching, but is mentally exhausted and tired from the increase in disruptive student behaviour and she finds it hard to manage distractions during transition times. She is thinking of retiring in the next couple of years. In class, she struggles to handle students who enter the classroom disruptive and noisy after lunch breaks, and Alison finds it hard to effectively tell the students to be quiet. She has asked for assistance, however the school cannot afford a teaching assistant.

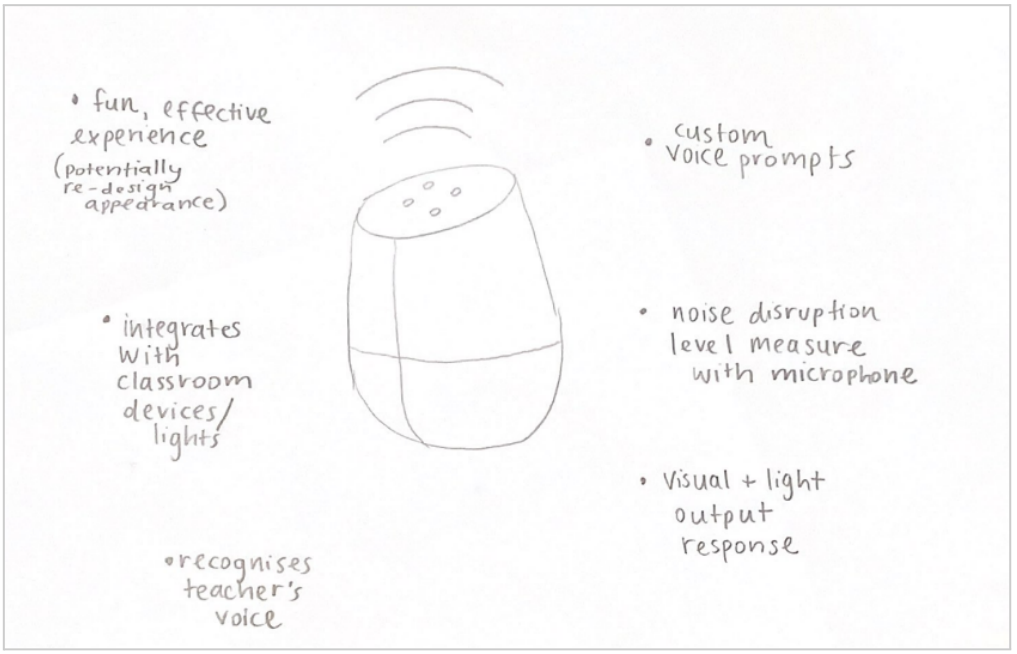
Goals:

- Be able to teach her class with the students engaged and focussed
- Make all her students like her and listen to her instructions
- Help students develop and succeed academically

Frustrations:

- Not having the means to effectively tell students to be quiet
- Getting tired and exhausted from students not listening to her commands

10.6 Initial Concept Solution Sketch



10.7 Interim Critique User Testing Plan

The following user testing plan showcases the studies that will be conducted to gain suggestions and feedback on the problem space as well as further insight into the focus area of disruptive student transition times in classrooms - the times during the day when students enter the classroom after being outside.

Key test objectives will include: further investigating stakeholder attitudes and experiences towards disruptive transition times as well as their thoughts and ideas of the current solution space design direction.

Key Activities:

- Qualitative Interviews
- Observations

Key Users:

- Teachers, Educators, Students - a minimum of three users will be tested initially

Equipment:

- Communication technology, equipment to audio record data, concept sketches

Interview

1. Introduce the team's project, problem space and theme.
2. Ensure the user is happy to proceed with the interview.
3. Begin asking the following questions.
4. Add/ask any additional follow-up questions you think would be useful for the interview.
5. Record responses with a transcript and add all raw data to 10.8 User Testing Results

General + Transition Time Questions:

What is your role or experience working with school students?

Do you have any experience or knowledge surrounding transition times?

How do you find the level of disruption when students first enter the classroom? How long does this last?

In your opinion, what impact do disruptive transition times have?

How are these transition times dealt with or managed in the classroom? What works and what doesn't?

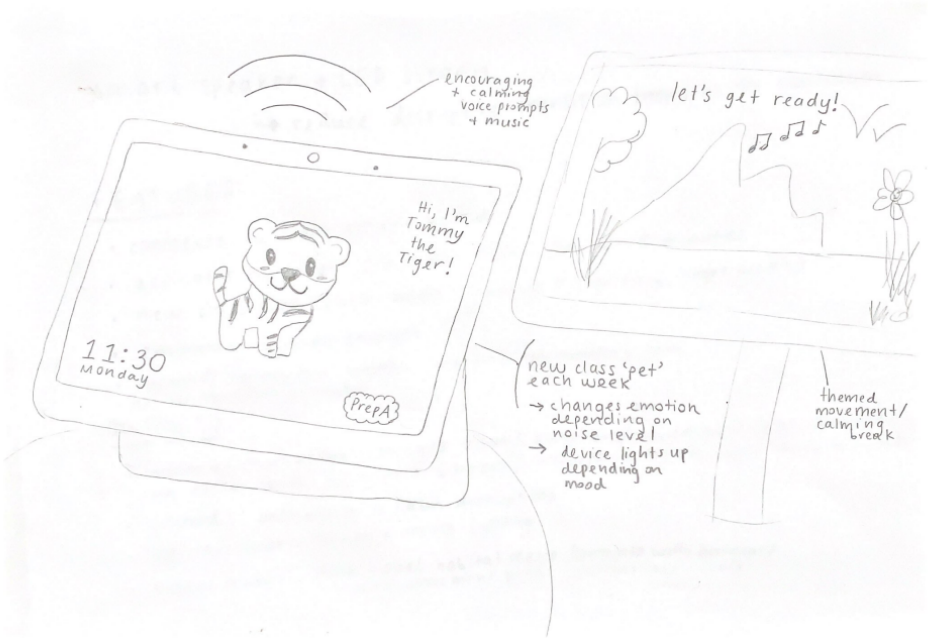
What do you think is needed to help with this problem?

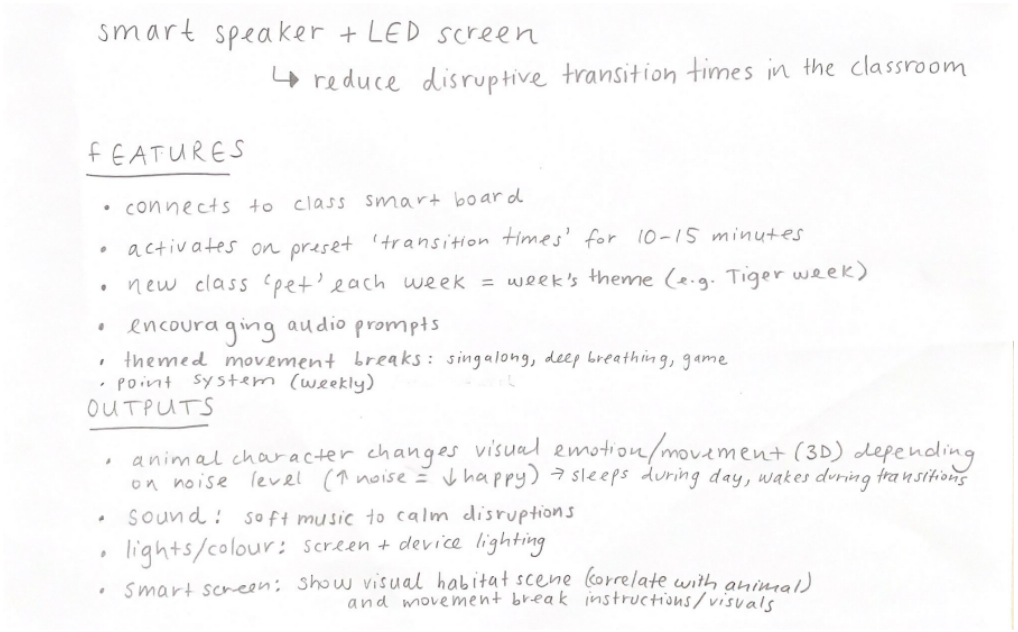
What is your experience with the level of noise in the classroom during transition times? What causes it and what consequences does a noisy class have?

What are some strategies to help reduce student disruption during transition times?

Concept Questions:

For the following questions: Briefly explain the concept to the user and show initial sketches of a prototype as illustrated below.





What do you think of this solution?

What aspects are effective? What aspects are not so effective in managing and reducing disruptive transition times in the classroom?

Do you think this product would integrate well with the classroom?

What other features could be used?

How would you improve this design? What about the look and features?

Do you have any further comments?

10.8 User Testing Results

Interview Raw Data Transcripts are provided below.

10.8.1 User 1

Occupation: Primary School Teacher

General + Transition Time Questions:

What is your role or experience working with school students?

Primary school teacher at various state schools.

Do you have any experience or knowledge surrounding transition times?

Yes - transition times are times when children become disruptive and it's a time when they feel they need a break because they've been concentrating for so long in a lesson - sometimes they need a movement break, a drink or a fruit break - sometimes they even need a game or something - by doing something like that, I have found really helps. There are 2 types of transition times - the first is when kids come in from breaks and the second type is between two lessons.

How do you find the level of disruption when students first enter the classroom? How long does this last?

I find because I know it is the transition time - I allow a 10 minute transition time incorporated into my lessons so I know when the kids come in after each break that the first 10 minutes I don't really plan to teach. When kids come in from breaks, there are alot of things that happen - sometimes students line up wanting to talk to me to report what happened during the break even though this should be mentioned elsewhere. In that 10 minutes I am attending to a handful of kids who need one on one attention. So that transition time frees the teacher time to attend to students who may need support after a disagreement on the playground. I find that it can take anything even up to 10 minutes depending on the class. Some classes are more mature - the students are more mature - it has nothing to do with the year level - a year 3 class could be more mature and they could be ready for learning even after 5 minutes, other year 3 classes can take up to 15 minutes to be ready for learning once they come in. It also depends on the weather - if it's been windy or hot or cold - weather and temperature I have found affect the behaviour of some students. If it's been raining and they've had to stay inside they can be disruptive.

In your opinion, what impact do disruptive transition times have?

If the transition time is disruptive the effect it has includes making many students distressed and upset by the students who are being disruptive. It leads to even more time being wasted as more students become upset and disruptive. This is like a chain reaction and next minute

the whole class is distracted - it eats into the learning time and it takes even longer to bring the class to a calm state to learn.

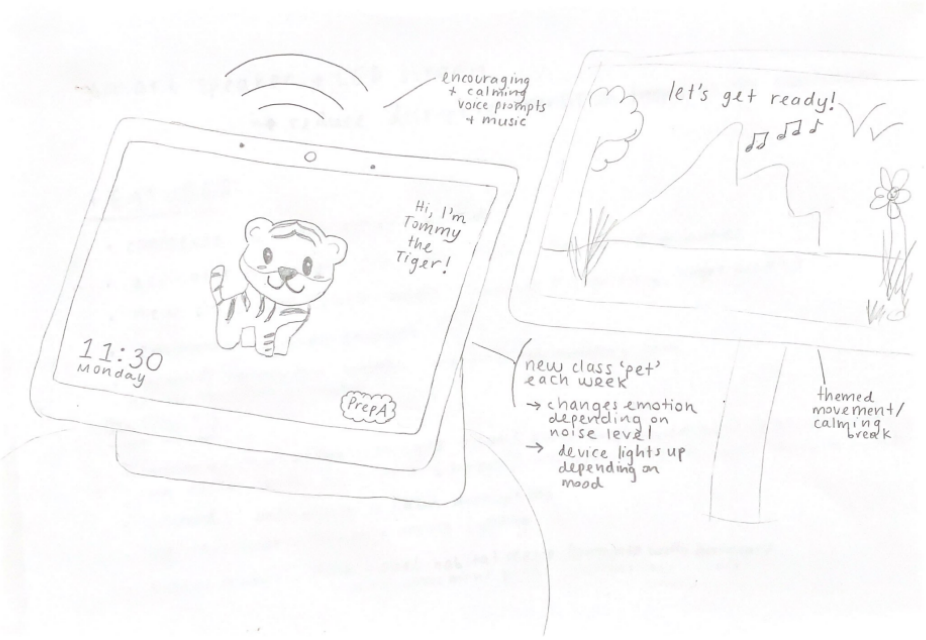
How are these transition times dealt with or managed in the classroom? What works and what doesn't?
They are managed through a number of strategies and tools. Silent reading, silent drawing, maybe peaceful music if you have access to it. Playing a game. I've found that playing a competitive, loud and exciting game doesn't always work. It hypes them up, whereas doing a calming activity is effective from my experience. Also something that is interesting to the kids helps.

What do you think is needed to help with this problem?
I think more resources and tools that interest the students and help the teacher to be free to attend to other students. Something the teacher doesn't have to be involved in - minimal involvement or supervision in that 10 minutes is good - so she can attend to other students, maybe someone cut their knee.

What is your experience with the level of noise in the classroom during transition times? What causes it and what consequences does a noisy class have?
Not good - it's probably on the high side if it's not dealt with correctly. They have come from outside where they have been running around or shouting playing games and there has been no sound requirement on the playground. The kids suddenly enter the classroom zone where the noise level has to be reduced - this is the transition - from a loud to a quiet environment. Other causes may also be lack of routine - they don't have something they can look forward to and a lot hate silent reading and try to get out of it.

What are some strategies to help reduce student disruption during transition times?
I think being consistent helps. If you keep day in day out doing this in transition time then they slowly learn that you are being consistent with the rules and establishing expectations, encouragement also helps. Kids thrive on routine.

Concept Questions:
For the following questions: Briefly explain the concept to the user and show initial sketches of a prototype as illustrated below.



smart speaker + LED screen

↳ reduce disruptive transition times in the classroom

FEATURES

- connects to class smart board
- activates on preset 'transition times' for 10-15 minutes
- new class 'pet' each week = week's theme (e.g. Tiger week)
- encouraging audio prompts
- themed movement breaks: singalong, deep breathing, game
- point system (weekly)

OUTPUTS

- animal character changes visual emotion/movement (3D) depending on noise level (↑ noise = ↓ happy) → sleeps during day, wakes during transitions
- sound: soft music to calm disruptions
- lights/colour: screen + device lighting
- smart screen: show visual habitat scene (correlate with animal) and movement break instructions/visuals

What do you think of this solution?

I think it's pretty excellent. I think it will capture the interests of the students because they can see that as a class pet - they can connect and have a feeling of ownership - they will look forward to coming in from the breaks so they will look forward to the transition period and making the animal happy - that gives them the motivation to follow the directions for transition time.

What aspects are effective? What aspects are not so effective in managing and reducing disruptive transition times in the classroom?

I think the fact that there is a character makes it really effective as kids can identify and take ownership with it. Perhaps there could be more of an interaction with the animal - if the smart speaker is on the side maybe the students could have a corresponding app on their ipads if the school has it or something on their desks - a small version of the character to see some facts or a simplified version to access to show their friends or family at home - some little feature.

Do you think this product would integrate well with the classroom?
Yes - definitely - it's using the interactive whiteboard which already exists and making it even more useful and catering for a great need.

What other features could be used?
There could be little stories about that animal like where do tigers live, what parts of the world - a little intro about that even scientific - so the kids are not only transitioned in their learning but learning new facts - so it becomes part of curriculum in a very effective way while they're having fun. You could do dinosaurs or sharks for one week.

How would you improve this design? What about the look and features?
You could give the actual sound of the animal like the tiger growl or different sounds of the animal when it's happy or when it's hungry. Those things could be incorporated into the audio - so you can see few of the behaviours of the animal and the mannerisms of the animal in different situations - playful, sleepy, upset which goes with the emotions. When the movement break is not happening it would be good to have the character on the main screen too. For the movement break I would do movement of the animal - so everyone's a tiger now, the tiger's stretching, yawning, now the tiger's happy - so they can use movements of the animal and pretend they are the animal - when the animal is relaxed and happy, not wild and loud - even the loudest animal can be quiet and relaxed. You could do a short game or quiz at the end on the tiger or even collaborative dot to dot colouring on the smart board. What sound do tigers make etc - and then they could get points maybe. I think at the start of the week the kids could get a copy of the tiger on paper or on their ipad. I think it's better if it's used only during transition times as if you leave it all day it will lose its novelty.

10.8.2 User 2

Occupation: Primary School Teacher

<u>General + Transition Time Questions:</u>

What is your role or experience working with school students?
Year 4 classroom teacher at an Ipswich state school.

Do you have any experience or knowledge surrounding transition times?
Yes.

How do you find the level of disruption when students first enter the classroom? How long does this last?
When the students first enter the classroom in the morning, there is minimal disruption. The students are quicker to settle and within 2 minutes, the students are ready to learn. However, when the students enter the classroom after each lunch break or after a specialist lesson, there is a much higher level of disruption that lasts for 5-10 minutes.

In your opinion, what impact do disruptive transition times have?
Less learning time and a decrease in teaching and learning quality. Once students are unsettled because of disruptive transitions, it is difficult to get the whole class back to a ready to learn state.

How are these transition times dealt with or managed in the classroom? What works and what doesn't?
Positive rewards for students who transition well, including individual and group rewards (stamps and tallies that go towards prizes).
Reminders for students who do not transition well, which moves them down the step chart closer towards an office referral. They also lose stamps.
Often brain breaks or an easy activity, such as silent reading, are used to help students transition, rather than going straight into work.
Some students show complete defiance to transition well, such as staying outside or joining in the activity. These strategies listed above do not work for these students when they are in a heightened state. Lunch times often cause some students, particularly those with ASD or ADHD, to become heightened.

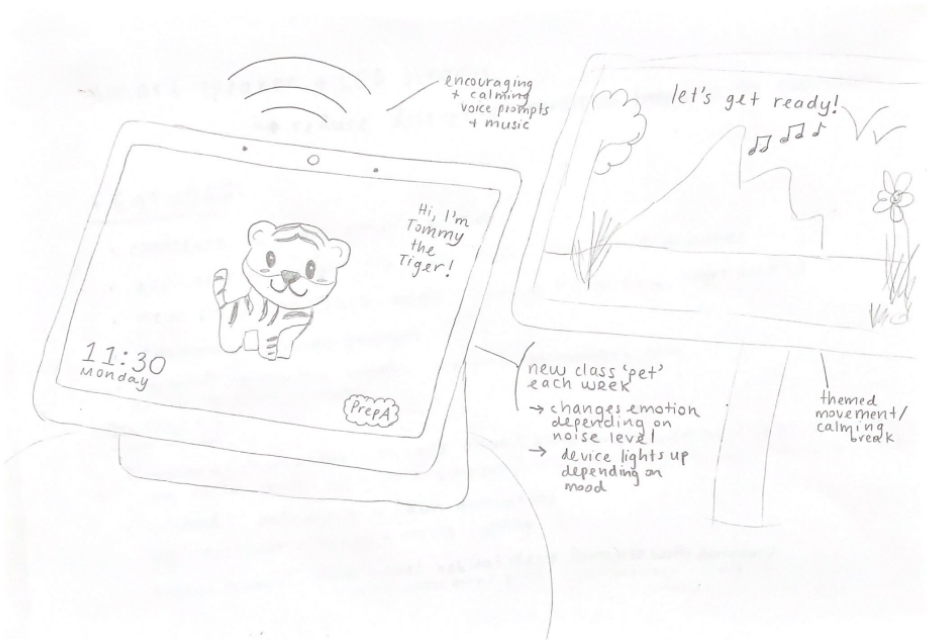
What do you think is needed to help with this problem?
I think creating a strategy for these students that consistently struggle to transition would be helpful. This is because it often only takes 1 or 2 students to be unsettled during transitions to trigger other students' misbehaviour.

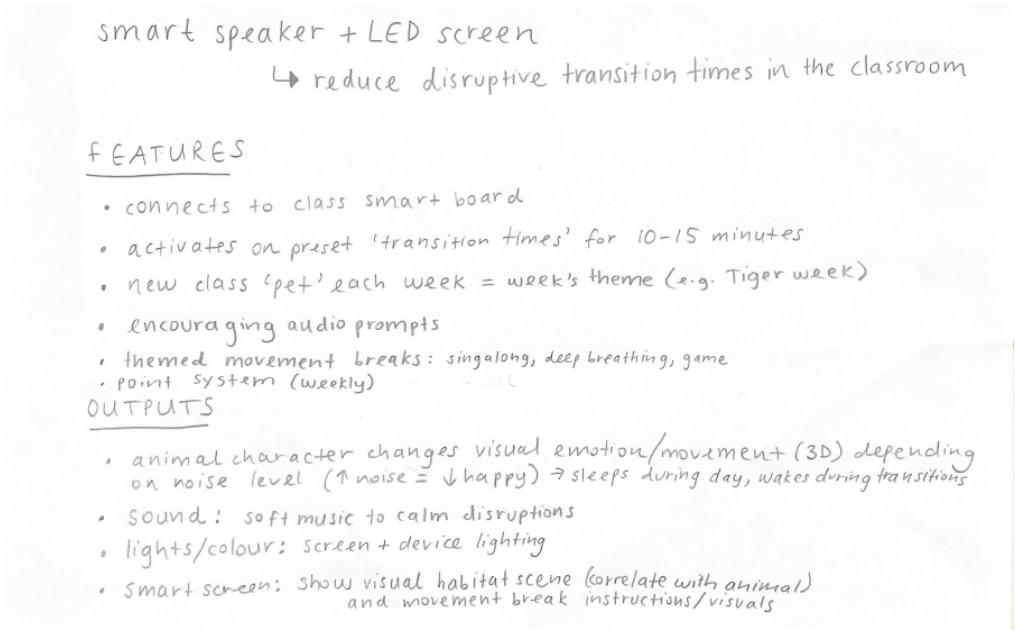
What is your experience with the level of noise in the classroom during transition times? What causes it and what consequences does a noisy class have?
Particularly after break times when students have been noisy in the playground, they struggle to readjust to the classroom environment and calming down, including reducing their noise levels. This again impacts learning time and quality of learning as I have to keep stopping

and implementing behaviour management strategies because I cannot talk over the top of my students.

What are some strategies to help reduce student disruption during transition times?
Challenges (e.g. the group who transitions the quickest and quietest will get 5 tally points.)
Brain breaks (short games, e.g. Simon Says, Silent Ball, Wordle)

Concept Questions:
For the following questions: Briefly explain the concept to the user and show initial sketches of a prototype as illustrated below.





What do you think of this solution?
Fantastic! I think this concept can be used through all primary school grades, not just early primary. You can easily create age appropriate games, singalongs etc to suit each grade.

What aspects are effective? What aspects are not so effective in managing and reducing disruptive transition times in the classroom?
Positives: Visual, engaging, relevant to the students, range of movement breaks available depending on the students' needs.

Negative: Unfortunately, many public schools do not have the funding for iPads/technology equipment. At my school, only P-3 have iPads. Maybe making this available as a computer program as well so it can be offered on a range of devices.

Do you think this product would integrate well with the classroom?
Yes.

What other features could be used?

Allowing it to be controlled by the teacher. For example, they can choose the pet, set the volume expectations based on the activity they are doing, choose the movement break that they kids need etc.

This program could be used throughout the whole school day, not just during transitions. The teacher could set noise levels for when the students are working to make sure the students aren't getting too loud during learning time, and the pet could monitor this with their emotions.

10.8.3 User 3

Occupation: UQ Education student

So what is your role or experience with or experience working with school students?

I'm studying education at UQ. I've been on prac a few times, just as observations and helping out in the classroom and I also tutor as my job.

What grades have you taught in those pracs?

The Practical and most were mostly grade sevens. Actually, I tutor anyway, from grade two to grade 12.

So do you have any experience on knowledge surrounding transition times?
It's a genuine pain, like the grade, two kids I tutor, like transitioning from reading to doing math and like tens and ones columns and he's like “nah”, this is a solid 10 minutes just going on that.

So how do you actually deal with getting the grade two kids from one activity to another?

I sit down and cry for a minute? I don't know who just, I just kind of, tell him to focus. “Come on, we're gonna be doing this now.”

So how do you find the level of disruptions? When students first, enter the classroom? And how long does this last?
I mean, it really depends on things like, classroom to classroom, and how the teacher deals with all that stuff. But generally the younger the kids, take longer as it takes for them to get settled.

They kind of still chat. Yeah and you know chat to the teacher and the teacher or either like no just go straight into the lesson.

So in your opinion, what impacts do disruptive and transition times have?
It just kind of was everything down especially with the way that the Australian school system works and like the consistent rush that we have to get through content. So that we can actually, you know, assess students properly. Transition times and like just having the long ones to bogs everything down and makes it so that you can't do as much as you need to.

So what type of disruptions like would you find in these disruptive just transition times?
Oh, I mean, nothing outside of really like just chatting to students or like students chatting among themselves.

How are these transition times dealt with or managing the classroom and what works and what doesn't?
What doesn't work is yelling at the kids and telling them to shut the fuck up like that. There's no way but kind of like engaging with them a little bit and slowly bringing them around and like trying to steer the conversation towards the topic kind of works or just letting them run themselves out. Like you know, like when teachers are like alright, cool. You're just gonna sit up here. I'm just gonna, start counting?

What do you think is needed to help with this problem?

Kids growing up. If you like, you can kind of like half a related topic with technology perhaps it could work. Like, if you put on a video like the ones with the robot who talks about the topic.

So what is your experience with the level of noise and classrooms during these transition times?
Big loud. Big loud chatty

What causes it and what consequences does it have?
The noisy classroom is the same as before with the disruptions. It's just kids being kids, really trying to like talk to each other and all that stuff, and it just kind of especially with the way a lot of schools are set up. Classrooms are right next to each other, with tiny little walls. So you're not only disrupting the flow of your class and the time that you need to take but you're also disrupting the classes nearby and frustrating for everyone.

All right, so from looking at this, what do you think of the solution?
I think it's pretty good. I like I think it's especially good for the little kids. What I would probably say is instead of like the mascot or 3d image or whatever. like changing emotions just kind of instead like modelling what they should be doing.It's like a role model.Kids are kind of like empathetic so if you they see the little tiger going they'll get kind of sad and kind of down. But if they tigers and like shushing or whatever. It'll might work a little better.

What aspects are effective and what aspects are not so effective, In managing or disrupting?
I think just like the entire idea of having something that they can focus on that isn't just the teacher speaking for a minute is like awesome. It's just a nice way for them to kind of quickly decompress and then be like, okay, cool we're here now and kind of gives them extra like a consistent reset each time. And it gets them into the habit of seeing this immediately. Okay, cool. We're here now. Learning.

What age group could this be for?
I think for this specific model you could probably honestly go up to like grade two. I think you would kind of tweak it a little bit. Make it a bit more mature. Just like as it keeps going on like

with the robot and stuff where it's kind of like a short introduction to the lesson again as it goes on. But like for a base like a basic model for just an entire thing.

So what other features could you use?
The role modelling one. I think it kind of incorporates stuff like the mascot goes through teaching games. Sort of like games and also sort of being like, alright, we're getting in the mindset.

What is your opinion on the medium of a smart speaker with a screen?
I would integrate it with the intelligent smart screen. As long as it can be projected, like it and it's like central and kids can kind of be like, okay, we've looked up here, I think it'll be pretty good.

10.9 Consequences of Disruptive Behaviour Throughout Classes

The background research detailed below gives more information regarding the consequences of disruptive behaviour as provided in the first revision of this report. The information highlighted in red was removed as it speaks in regards to student disruptive behaviour that occurs more generally throughout class lessons. As a result of feedback, this information is less applicable, as we have focused our attention on the problem of student disruptions during classroom transition times. What is provided below are how the specified sections were originally written.

Consequences on the Student Engaging in Disruptive Behaviour

Poor academic achievement has long often been a consequence associated with disruptive behaviour (Johnson et al., 2005). Even from early childhood education, young children who exhibit and engage in disruptive classroom behaviours are at risk of having various academic problems throughout their school progression (Watson et al., 2016). They are also at risk for having behavioural problems as they continue during their schooling years (Watson et al., 2016; Miller, n.d.). Studies have identified how youth aged children who have displayed disruptive behaviours display greater reading inadequacy, achieve below average test scores, have grade point averages which are lower, and show a greater occurrence of underachievement (Johnson et al., 2005). They are also more likely to drop out of high school, and for those who attend college, exhibit lower rates of attendance (Johnson et al., 2005). These latter ramifications identified can have implications on their future and future employment. The result of such behaviours thus has potential consequences that expand further than just a moment of interruption and disturbance to the lesson in a class. Instead it may impact the student causing the interruptions to a much larger degree.

Consequences on Student Peers

A child engaging in disruptive behaviour can also affect the entire class, as their misbehaviour can lead to a decrease in learning time (Little, 2003 as cited in Clunies-Ross et al., 2008), which can then have a detrimental effect on students' learning (Watson et al., 2016). Disruptive behaviours in school show to be a notable stressor for students (Nash et al., 2016). According to the Good Childhood Inquiry Report from 2009 cited by Nash et al. (2016), 43% of students had mentioned that it was 'always' or 'often' difficult for them to concentrate in class as a result of other classmates' noise. This can be due to the constant interruptions which can lead to interferences with students' ability to focus (Miller, n.d.). When one or more students behave in a manner that is disruptive, the learning process for their classmates becomes affected as they may be forced to have to wait for such behaviours to be addressed by the teacher (Miller, n.d.). The disruptive student's attempt to be noticed may

also sidetrack other students from their learning and engagement in class (Miller, n.d.). The significant effects of peer influence may also encourage other students to engage in similar disruptive behaviours that they may not have otherwise engaged in (Miller, n.d.). Such negative behaviours can thus lead to other students displaying behavioural issues, and it also can result in lower grades among students (Miller, n.d.).

Consequences on Teachers

Disruptive behaviours can also have negative consequences on teachers. Managing students' behaviour in the classroom effectively is a continued universal challenge for teachers, with students' disruptive behaviours being "one of the greatest daily stressors" that school teachers experience (Nash et al., 2016). Research has shown that often, it is behaviours which are relatively minor yet frequently occurring, such as talking out of turn (TOOT), hindering other children, or making unnecessary noises, which cause the most concern to teachers (Clunies-Ross et al., 2008). Amidst the other sources of stress that teachers must deal with, the cumulative effects of students' misbehaviours can lead to burnout and stress for teachers (Clunies-Ross et al., 2008). An Australian study conducted by Clunies-Ross et al. (2008) regarding classroom management strategies, teacher stress and student behaviour revealed that TOOT in particular was the troublesome behaviour which occurred most frequently amongst students. Behaviours such as this have poor effects not just on teachers' wellbeing, but also on their teaching.

10.10 Meeting Log

Week 4 (25/3)

- **Plan:**
- Share ideas
- Prep for report-back + narrow down problem space/theme
- Team charter + team name (find meeting times etc - fill template)

- **Updates:**

- **To Do (before next meeting):**
- Background research in Google Doc (https://docs.google.com/document/d/1mVkIoXaMz9K4lY2u37PBuvtpV_3exae6eKINhkCeGJw/edit) on Theme: Bad/Negative Student Behaviour

- **Next Week:**
- Use Discord/Zoom for Studio sessions
- Create Timeline for project report

Week 5 Studio (29/3)

Studio:

- Conversations with parents/teachers to assist with problem identification
- Specific age and specific behaviour e.g. verbal disruption in early primary school aged children (audio, talking modes of interaction can build into solutions, actions)
- Potential imagined solution and how we think it's logical
- Research domain/problem space and keep thinking about potential solution (later on connect envisioned solution to research)
- If teachers say digital not right solution – can pivot solution
    - Device student say ho
    - Educational -
    - Behaviour changing wearable - positive reinforce good behaviour -
    - Filter what child can see specific to good behaviour
    - Verbal disruption: voice assistant (like siri) that activate on voice trigger maybe if voice raised dim light and whole classroom
- Google survey
- Specific problem for specific audience

To Do:

- look at report doc and tasks on excel doc
- complete required sections
- consult with other members who you are paired up with for tasks

Next Meeting Friday 6pm:
To discuss:
- questions/project plan/concept sections
- report progress + presentation plan

Week 5 (1/4)

Plan:
- questions/project plan/concept sections
- report progress → complete by __?
- presentation plan
- Survey?
- Third person

To Do:
- Complete allocated sections by MONDAY 11:59pm
- Presentation plan - PPT/script: meet 3:15pm → see teams msg - who presenting? Who sharing screen?
- Slide for part you've done before meet

Week 6 (4/4)

Plan:
- Presentation plan - PPT/script: meet 3:15pm → see teams msg - who presenting? Who sharing screen?
- Slide for part you've done before meet

To Do:
- Complete allocated sections by MONDAY 11:59pm

Week 7 (14/4)

1. TO DO: - research into transition time/behaviour concept ideas
2. Next Meeting: Thursday 5pm To discuss: - report/user testing plan + concept direction - feedback to address + allocation

Using music to set the environment + visual cue - sleeping baby dont wake up when get back to class
- Using music as way to help with that transition period
- Giving reminders for change - 10 mins to lunch
- Different music for different transitions between different times
- Interaction
- Prep –
- Focussing on transitioning good direction to take it in - more specific
- Transition times

Mid-Sem Break (21/4)

Plan:

- To discuss:
    - feedback + team reflection sections
    - finalise current concept + conceptual model part
    - presentation plan: slides + script for Tuesday April 26 WEDNESDAY 11:59
- FEEDBACK report - dot points
- Krista: add details to team charter + report

To Do:

- Complete allocated sections by DATE
- Also To Do: michelle/chris/amelia - rework current research paragraphs + intros to suit transition time focus area
- Presentation plan - PPT/script: → who presenting? Who sharing screen?

- Target group: classrooms in prep to year 2 (students + teachers)
- Overview + conclusion
- Conceptual model
- q s part - how to left
- Research feedback
- Team reflection - 2 people

Progress
Team feedback
Team collaboration

Week 10 (13/5)

- User testing: don't need to make digital prototype for this as complex idea - something more paper prototype more appropriate for idea - draw tiger drawings with someone moving them around and picking them up = prototype for project
- Draw tiger with different emotions - sleeping then crying - what would you do if -
- User test with children and teacher and see what they think of solution prototype - "what do you think children would think of that?" - screenshots from example videos - example for one in prototype - yoga
- Movement breaks: table describing each with short description and mock image of each activity
- Cut down report -

- Exhibit - how to demonstrate idea with posters and prototypes we used for user research

PROTOTYPE SCREENS TO DRAW (drawing screen only)

- sleeping/idle avatar not in use - Kai
- When children come in - avatar upset - Amelia
- role model - doing work/sitting at desk/showing right behaviours/focussed on work not reacting to misbehaviours - Michelle
- Happy tiger - Martin
- Humanoid version to justify if classroom pet is better? - human for each of three states
- Movement breaks: tiger stretching/yoga with music - Chris
- Movement breaks: person stretching/yoga with music - Krista

MEETING: **Friday 6pm**

- **Discuss drawings**
- **User testing plan:** showing drawings with questions (test in wk 11) - child/educator
    - “Also have you interviewed stakeholder groups such as parents or teachers, or learning resource developers regarding the impact of such a solution with such content on the learning & early childhood development process?”
    - “consider different ways that people interact with the solution - by conducting some interactive testing, you could look at how kids want to interact with it and build that into your solution”
    - Which is better, role model or reactive/emotive response?
    - Which avatar is better - class friend or class pet? (class friend wouldn’t have weekly themes)

Week 11 (17/5)

- **Discuss wk 12:**
    - **Prototype plan:** who will create the final exhibit prototype (refined consistent sketches)
    - Krista to update video - slower, calmer music, show both phases, Timmy the Tiger transition time example
        - Exhibiting to people who don’t know solution
            - Communicate solution + problem space
            - Include sketches to communicate idea
            - Present this into pitch/point to it etc - just poster etc
    - **Exhibit plan:** how to demonstrate our idea? Branding? Posters?
    - *come up with a name for the solution?* - flyers (advertising theme) - how people will use product/selling points

    - The Exhibit in week 13 will be an opportunity to explain the work you have done this semester and to demonstrate how the culmination of your design work specifies a good solution to the problem you have identified and investigated. You will be required to explain your proposed solution and justify the design decisions you have made to arrive at the specified system based on your research, user studies, and so on. The content of your display will clearly depend on the specifics of your project, but we expect a combination of poster displays and materials you have produced and used in your project to support you explaining and discussing the work.
- **Report progress:** see feedback that is important to incorporate into Report 3 →

Report 3 Plan:

- **Overview - do later**
    - Don't be afraid to talk more about your project and what you've been though in this section
        - Maybe we can include a small paragraph briefly discussing our team processes to address this
- **Research: Amelia/Krista**
    - Acknowledge research feedback given - classroom layout research…
    - 1.2.3 Causes of Disruptive Behaviour - remove unnecessary sections as don't go with solution space - classroom env more relevant etc (put in appendix) and replace with 1 sentence say these are also considered - Amelia
    - 1.3 Solution Space - consider which subsections can be adapted to a digital solution, remove unnecessary sections (put in appendix) and replace with 1 sentence say these are also considered
    - 1.4 Current Technologies - better connect to solution space - link/refer to research sections in previous sections
    - 1.5 Considerations for Future Features - better connect to research
- **Stakeholders: - Krista**
    - Work on your formatting, you don't need to have everything as paragraphs and paragraphs i'm especially thinking of your stakeholders and conceptual model
    - Add stakeholder summary to start of section (2.1)
    - 2.0 Stakeholders - briefly mention parents in minor stakeholders
    - 2.2 Teachers - don't introduce new research - tie it back to research section
    - 2.3 Minor Stakeholders - be clearer on their involvement - parents: home environment/routine if kids haven't learnt routine may struggle more transitioning during transition times (link to causes of bad behaviour section etc)
- **Conceptual Model: - Martin**
    - Work on your formatting, you don't need to have everything as paragraphs and paragraphs. I'm especially thinking of your stakeholders and conceptual model. Have you guys seen that conceptual model template from deco2500?
        - Dot points
        - Diagram to show phase flow
        - Functional and non-functional requirements list?
            - Accessibility (affordability - can schools afford etc), reliability (detecting things)

- Refined sketches - come back to
- Be specific with some examples of music movement break etc (output of solution)
- refer to sections 1.3,1.4,1.5
- Include:
    - Use cases (user journeys etc)
    - Design storyboard
    - Technical requirements - key features
    - Non functional requirements
- Storyboard - put hand drawn version in appendix - Amelia
- Movement break table examples: create table with different randomised activities and a short description of each with image - example content (also table with animal variation examples?) - Amelia

- **Studies: (Michelle - User Testing Analysis)**
    - Formatting!! Consider dot points/tables - do later
    - More interviews
    - Interview analysis showing support/justification for concept design
    - Acknowledgement in user studies as to why chose Animal avatar - why came to that? What other forms could that take?
        - Children can empathise with a classroom pet and digitise that like a role model to help support students on how to act during transition times and better relate to children
        - Emotional component with way avatar reacts to student behaviour
        - notes: - children tend to persevere and keep trying and playing with technology, exploring it until it works, so our technology could be good for them and effective - researching and testing with actual children will be good, since we as adults have our biases and aren't children, and likewise teachers, though working with children, also have their biases and aren't children
    -
    - User testing: don't need to make digital prototype for this as complex idea - something more paper prototype more appropriate for idea - draw tiger drawings with someone moving them around and picking them up = prototype for project
    - Acknowledge needed more research but limitations present (time, resources)
        - acknowledge shortcomings in user research and gaps in knowledge, biases, etc.- no access etc
- **Prototype: - Krista (to do later)**
    - Refined final prototype
    - For the prototype:
        - something more paper prototype-y
        - wizard of oz-like prototype to show different components of e.g. the tiger's different responses??
        - **Prototype plan:** (refined consistent sketches)
        - Krista to update video - slower, calmer music, show both phases, Timmy the Tiger transition time example
            - Exhibiting to people who don't know solution

- Communicate solution + problem space
- Include sketches to communicate idea
- Present this into pitch/point to it etc - just poster etc

- **Questions: KAI or CHRIS**
  - While you should obviously aim to have resolved any questions previously identified, and tried to address all significant knowledge about the problem and solution space, it is possible that some areas remain unresolved, particularly if they have arisen as a result of more recent design work. You should make sure these are communicated to the build team in a structured and prioritised manner so that they can quickly act at the start of next semester to resolve them.
- **Project Plan: CHRIS**
  - make plans more actionable - tasks should be assigned to specific team members (Gantt chart needs people assigned to tasks - see Scott's comment)
  - It doesn't make sense to include a plan of future work in a final report. However, the plan from your previous deliverables is potentially a useful resource to explain your team's process and progress through the semester. It should therefore be rethought as part of your team's documentation and reporting of work done.
- **Team Reflection: KAI**
  - Formatting! Consider dot points/tables
  - Update this section to discuss project semester-wide etc
  - In addition to the existing report structure, each team should also include a commentary on the team's work on the project this semester. For a team to be effective, team members must pay attention to both the task they are collectively engaged in, and on the process of maintaining the team as an effective collaborative unit. The report should include a separate section which covers in particular reflection on two broad areas: (i) the content - the direction that the project has taken and the team's work focused on the project goals, etc.; and (ii) on the process that the team has followed and how effectively they worked as a unit. Focus on both what worked well and what could have been done better. The restrictions we are working under due to COVID-19 have continued to be a significant challenge this semester and you also reflect on the impact this has had, both in terms of how it may have made aspects of your tasks and teamwork harder, but also how you have creatively addressed this to continue working, and even how some aspects of this semester's restrictions may have made things better! Working in hybrid teams is an increasingly common feature of work in our industry, and the continued focus on hybrid collaboration in this course is motivated by the need for all of us to develop better strategies to collaborate in different locations and times.
- **Conclusion - do later**
  - Update conclusion to describe project aims/outcomes etc
- **Appendix:**
  - Add exhibit materials etc post exhibit

Week 12 (24/5)

- 1 Research Poster* (A3): Amelia
  - Research, user studies, design, audience, problem space, direction taken
  - Stakeholder with personas, short quotes from user interviews
- 2 Design process Poster* (A3): Michelle
  - Design process /solution explanation
  - Timeline with different prototypes
  - Photo of the final solution
- 3 Prototype Poster* (product info) (A3/A4) - Krista
  - Prototype Flyers (A5)
- Pitch slides + dot points (with info about 1,2,3) - Martin + Chris
  - Problem space, Research, user studies, stakeholders, design process + solution/prototype
  - Ongoing slides shared
- Video of Timmy tiger example - Kai
- Final Prototype sketches - Kai
- Laptop showing video / hybrid mode (share screen posters)?
  - Teams channel meeting
  - Bring bluetack/tape on Tuesday
  - **TO PRINT Monday at officeworks or UQ**
- Prototype name ideas: class calm, class pet, pet pal, calminal /
- **“Calmimal: The digital classroom pet” - Calmimal is a Calming Transition Time Classroom Companion for Students in Prep - Year 2**

- **Report progress:** see feedback that is important to incorporate into Report 3 →
- Talk about ethics
- NEW FEEDBACK
  - w stakeholder did interviews with this didn't (in each explain how engaged)
  - refer to section 1 - be specific where to refer to
  - figures - better used - heres what it is why it is here

Report 3 Plan:

- **Overview - do later**
  - Don't be afraid to talk more about your project and what you've been though in this section
    - Maybe we can include a small paragraph briefly discussing our team processes to address this

- **Research: Amelia/Krista**

- 1.2.3 Causes of Disruptive Behaviour - remove unnecessary sections as don't go with solution space - classroom env more relevant etc (put in appendix) and replace with 1 sentence say these are also considered - Amelia
- 1.3 Solution Space - consider which subsections can be adapted to a digital solution, remove unnecessary sections (put in appendix) and replace with 1 sentence say these are also considered
- 1.4 Current Technologies - better connect to solution space - link/refer to research sections in previous sections
- 1.5 Considerations for Future Features - better connect to research

- **Stakeholders: - Krista**
  - New scott comment
  - Work on your formatting, you don't need to have everything as paragraphs and paragraphs i'm especially thinking of your stakeholders and conceptual model
  - Add stakeholder summary to start of section (2.1)
  - 2.0 Stakeholders - briefly mention parents in minor stakeholders
  - 2.2 Teachers - don't introduce new research - tie it back to research section
  - 2.3 Minor Stakeholders - be clearer on their involvement - parents: home environment/routine if kids haven't learnt routine may struggle more transitioning during transition times (link to causes of bad behaviour section etc)

- **Conceptual Model: - Martin**
  - New scott comment
  - Work on your formatting, you don't need to have everything as paragraphs and paragraphs. I'm especially thinking of your stakeholders and conceptual model. Have you guys seen that conceptual model template from deco2500?
    - Dot points
    - Diagram to show phase flow
    - Functional and non-functional requirements list?
      - Accessibility (affordability - can schools afford etc), reliability (detecting things)
  - Refined sketches - come back to
  - Be specific with some examples of music movement break etc (output of solution)
  - refer to sections 1.3,1.4,1.5
  - **Include:**
    - Use cases (user journeys etc)
    - Design storyboard
    - Technical requirements - key features
    - Non functional requirements

- ~~Storyboard - put hand drawn version in appendix - Amelia~~

- Movement break table examples: create table with different randomised activities and a short description of each with image - example content (also table with animal variation examples?) - Amelia

- **Studies: (Michelle - User Testing Analysis)**
  - Formatting!! Consider dot points/tables - do later
  - More interviews
  - Interview analysis showing support/justification for concept design
  - Acknowledgement in user studies as to why chose Animal avatar - why came to that? What other forms could that take?
    - Children can empathise with a classroom pet and digitise that like a role model to help support students on how to act during transition times and better relate to children
    - Emotional component with way avatar reacts to student behaviour
    - notes: - children tend to persevere and keep trying and playing with technology, exploring it until it works, so our technology could be good for them and effective - researching and testing with actual children will be good, since we as adults have our biases and aren't children, and likewise teachers, though working with children, also have their biases and aren't children
  -
  - User testing: don't need to make digital prototype for this as complex idea - something more paper prototype more appropriate for idea - draw tiger drawings with someone moving them around and picking them up = prototype for project
  - Acknowledge needed more research but limitations present (time, resources)
    - acknowledge shortcomings in user research and gaps in knowledge, biases, etc.- no access etc

- **Prototype: - Krista (to do later)**
  - Refined final prototype
  - For the prototype:
    - something more paper prototype-y
    - wizard of oz-like prototype to show different components of e.g. the tiger's different responses??
    - **Prototype:** (refined consistent sketches)
    - Krista to update video - slower, calmer music, show both phases, Timmy the Tiger transition time example
      - Exhibiting to people who don't know solution
        - Communicate solution + problem space
        - Include sketches to communicate idea
        - Present this into pitch/point to it etc - just poster etc

- **Questions: KAI or CHRIS**

- While you should obviously aim to have resolved any questions previously identified, and tried to address all significant knowledge about the problem and solution space, it is possible that some areas remain unresolved, particularly if they have arisen as a result of more recent design work. You should make sure these are communicated to the build team in a structured and prioritised manner so that they can quickly act at the start of next semester to resolve them.
- Acknowledge research feedback given - classroom layout research… further research into these areas is needed to look at how classroom layout affects transition time effectiveness etc..

- **Project Plan: CHRIS**
  - make plans more actionable - tasks should be assigned to specific team members (Gantt chart needs people assigned to tasks - see Scott's comment)
  - It doesn't make sense to include a plan of future work in a final report. However, the plan from your previous deliverables is potentially a useful resource to explain your team's process and progress through the semester. It should therefore be rethought as part of your team's documentation and reporting of work done.

- **Team Reflection: KAI**
  - Formatting! Consider dot points/tables
  - Update this section to discuss project semester-wide etc
  - In addition to the existing report structure, each team should also include a commentary on the team's work on the project this semester. For a team to be effective, team members must pay attention to both the task they are collectively engaged in, and on the process of maintaining the team as an effective collaborative unit. The report should include a separate section which covers in particular reflection on two broad areas: (i) the content - the direction that the project has taken and the team's work focused on the project goals, etc.; and (ii) on the process that the team has followed and how effectively they worked as a unit. Focus on both what worked well and what could have been done better. The restrictions we are working under due to COVID-19 have continued to be a significant challenge this semester and you also reflect on the impact this has had, both in terms of how it may have made aspects of your tasks and teamwork harder, but also how you have creatively addressed this to continue working, and even how some aspects of this semester's restrictions may have made things better! Working in hybrid teams is an increasingly common feature of work in our industry, and the continued focus on hybrid collaboration in this course is motivated by the need for all of us to develop better strategies to collaborate in different locations and times.

- **Exhibit Recap + future hopes**
  - Describe exhibit and future direction for solution
  - Include exhibit set up photos (from group chat)
  - Link posters in appendix

- respond to any critique/Q&A provided at the exhibit to improve the quality of the deliverables - comment on data etc with schools as future direction?

- **ETHICS + success factor stuff!**
  - Discuss ethical considerations - ethics about children/teaching interventions to discuss - also state we are not teachers
  - You should not only include the proposed solution but also identify success criteria and a process for evaluation of the solution. The solution will describe *what* is required to be developed, but not *how*- the technical detail of the solution is the challenge for the next team in the Build part of Studio 3. You should pay particular attention to how the proposed solution is appropriate for the problem context, including any organisational, cultural, or other situational factors, and a description of the ethical issues considered in the proposed solution, along with any specific measures taken to ensure that the design treats ethical matters appropriately.

- **Conclusion - do later**
  - Update conclusion to describe project aims/outcomes etc

- **Appendix:**
  - Add exhibit materials etc post exhibit
  - Include all prototype materials created
    - This submission should also include any materials that would be used by a team charged with implementing the solution, e.g. the low/medium-fidelity prototypes and other items developed to test aspects of the proposed design.

Your design proposal will at least consist of the following:

- Project purpose
- Intended audience (stakeholders)
- Use cases (user journeys etc)
- Design storyboard
- Technical requirements
- Non functional requirements

Also talk about 'ethics'

You should not only include the proposed solution but also identify success criteria and a process for evaluation of the solution. The solution will describe *what* is required to be developed, but not *how*- the technical detail of the solution is the challenge for the next team in the Build part of Studio 3. You should pay particular attention to how the proposed solution is appropriate for the problem context, including any organisational, cultural, or other situational factors, and a description of the ethical issues considered in the proposed solution, along with any specific measures taken to ensure that the design treats ethical matters appropriately.

This submission should also include any materials that would be used by a team charged with implementing the solution, e.g. the low/medium-fidelity prototypes and other items developed to test aspects of the proposed design.

Final submission of project deliverables will take place in the first week of examinations allowing time for the team to respond to any critique/Q&A provided at the exhibit to improve the quality of the deliverables.

Week 13 (3/6)

Final Report Plan:

Your design proposal will at least consist of the following:

- Project purpose
- Intended audience (stakeholders)
- Use cases (user journeys etc)
- Design storyboard
- Technical requirements
- Non functional requirements

- **Overview - REWORK - Amelia**
  - Don't be afraid to talk more about your project and what you've been though in this section
    - Maybe we can include a small paragraph briefly discussing our team processes to address this
    - Talk about solution etc

- **Research: Amelia/Krista**
  - ~~1.2.3 Causes of Disruptive Behaviour - remove unnecessary sections as don't go with solution space - classroom env more relevant etc (put in appendix) and replace with 1 sentence say these are also considered - Amelia~~
  - ~~1.3 Solution Space - consider which subsections can be adapted to a digital solution, remove unnecessary sections (put in appendix) and replace with 1 sentence say these are also considered~~
  - ~~1.4 Current Technologies - better connect to solution space - link/refer to research sections in previous sections~~
  - ~~1.5 Considerations for Future Features - better connect to research~~

- **Stakeholders: - Krista**
  - New scott comment
  - ~~Work on your formatting, you don't need to have everything as paragraphs and paragraphs i'm especially thinking of your stakeholders and conceptual model~~
  - ~~Add stakeholder summary to start of section (2.1)~~
  - ~~2.0 Stakeholders - briefly mention parents in minor stakeholders~~
  - ~~2.2 Teachers - don't introduce new research - tie it back to research section~~

- ~~2.3 Minor Stakeholders - be clearer on their involvement - parents: home environment/routine if kids haven't learnt routine may struggle more transitioning during transition times (link to causes of bad behaviour section etc)~~

- **Conceptual Model: - Martin - Michelle ethic**
  - New scott comment
  - ***A high level description of the planned solution which clearly identifies the team's final intentions for the design, including functional and nonfunctional requirements and consideration of how they should be evaluated . Thought has been given to how this relates to background work and results from any study carried out so far to justify the design and requirements.***
  - ~~Work on your formatting, you don't need to have everything as paragraphs and paragraphs. I'm especially thinking of your stakeholders and conceptual model. Have you guys seen that conceptual model template from deco2500?~~
    - ~~Dot points~~
    - Diagram to show phase flow
    - Functional and non-functional requirements list?
      - Accessibility (affordability - can schools afford etc), reliability (detecting things)
  - Refined sketches - come back to
  - Be specific with some examples of music movement break etc (output of solution)
  - refer to sections 1.3,1.4,1.5
  - **Include:**
    - Use cases (user journeys etc)
    - Design storyboard
    - Technical requirements - key features
    - Non functional requirements

  - LINK TO all prototypes made!
  - Movement break table examples: create table with different randomised activities and a short description of each with image - example content (also table with animal variation examples?) - Amelia

- **Studies: (Michelle - User Testing Analysis)**
  - Update with third interview!
  - Formatting!! Consider dot points/tables - do later
  - More interviews
  - Interview analysis showing support/justification for concept design
  - Acknowledgement in user studies as to why chose Animal avatar - why came to that? What other forms could that take?

    - Children can empathise with a classroom pet and digitise that like a role model to help support students on how to act during transition times and better relate to children
    - Emotional component with way avatar reacts to student behaviour
    - notes: - children tend to persevere and keep trying and playing with technology, exploring it until it works, so our technology could be good for them and effective - researching and testing with actual children will be good, since we as adults have our biases and aren't children, and likewise teachers, though working with children, also have their biases and aren't children
  -
  - User testing: don't need to make digital prototype for this as complex idea - something more paper prototype more appropriate for idea - draw tiger drawings with someone moving them around and picking them up = prototype for project
  - Acknowledge needed more research but limitations present (time, resources)
    - acknowledge shortcomings in user research and gaps in knowledge, biases, etc.- no access etc

- **Prototype: - Krista**
  - Show prototype progress - 1 at each stage
  - Description of prototypes used for user studies
  - Link to videos (drive)

- **Questions: KAI / Amelia**
  - ***Remaining questions/ uncertainty (what areas of knowledge have you identified that still require investigation to learn more about the problem/ solution?)***
  - ***Insightful points raised that demonstrate a good grasp of the team's understanding of the problem space; what, if any, further knowledge is required to improve understanding and advance the design process; and what activities will be required by the Build team to acquire this knowledge.***
    - While you should obviously aim to have resolved any questions previously identified, and tried to address all significant knowledge about the problem and solution space, it is possible that some areas remain unresolved, particularly if they have arisen as a result of more recent design work. You should make sure these are communicated to the build team in a structured and prioritised manner so that they can quickly act at the start of next semester to resolve them.
    - Acknowledge research feedback given - classroom layout research… further research into these areas is needed to look at how classroom layout affects transition time effectiveness etc..

- **Project Plan: CHRIS**

  - ***Project Plan (represented as part of process documentation) (how did you carry out your work as a team to achieve the project outcomes?***
  - ***Clear breakdown of project into milestones, deliverables, strands, etc. as appropriate for the current final stage of the design, and documentation of any agreed processes for team maintenance.***
  - make plans more actionable - tasks should be assigned to specific team members (Gantt chart needs people assigned to tasks - see Scott's comment)
  - It doesn't make sense to include a plan of future work in a final report. However, the plan from your previous deliverables is potentially a useful resource to explain your team's process and progress through the semester. It should therefore be rethought as part of your team's documentation and reporting of work done.

- **Team Reflection: KAI**
  - ***The team presents a reasoned and critical consideration of both task and process aspects of the project progress, providing insights into both strengths and weaknesses of the project and identifies key learning outcomes arising for the team. Problems arising from team conflict have been identified and addressed effectively, with or without support from the studio teaching team, but they have been fully aware of the situation and its resolution.***
  - Formatting! Consider dot points/tables
  - Update this section to discuss project semester-wide etc
  - In addition to the existing report structure, each team should also include a commentary on the team's work on the project this semester. For a team to be effective, team members must pay attention to both the task they are collectively engaged in, and on the process of maintaining the team as an effective collaborative unit. The report should include a separate section which covers in particular reflection on two broad areas: (i) the content - the direction that the project has taken and the team's work focused on the project goals, etc.; and (ii) on the process that the team has followed and how effectively they worked as a unit. Focus on both what worked well and what could have been done better. The restrictions we are working under due to COVID-19 have continued to be a significant challenge this semester and you also reflect on the impact this has had, both in terms of how it may have made aspects of your tasks and teamwork harder, but also how you have creatively addressed this to continue working, and even how some aspects of this semester's restrictions may have made things better! Working in hybrid teams is an increasingly common feature of work in our industry, and the continued focus on hybrid collaboration in this course is motivated by the need for all of us to develop better strategies to collaborate in different locations and times.

- **Exhibit Recap + future hopes**
  - Describe how exhibit went and future direction for solution
  - Include exhibit set up photos (from group chat)
  - Link posters in appendix

- respond to any critique/Q&A provided at the exhibit to improve the quality of the deliverables - comment on data etc with schools as future direction?

- **ETHICS + success factor stuff!**
  - Discuss ethical considerations - ethics about children/teaching interventions to discuss - also state we are not teachers
  - You should not only include the proposed solution but also identify success criteria and a process for evaluation of the solution. The solution will describe *what* is required to be developed, but not *how*- the technical detail of the solution is the challenge for the next team in the Build part of Studio 3. You should pay particular attention to how the proposed solution is appropriate for the problem context, including any organisational, cultural, or other situational factors, and a description of the ethical issues considered in the proposed solution, along with any specific measures taken to ensure that the design treats ethical matters appropriately.

- **Conclusion - rework**
  - Update conclusion to describe project aims/outcomes etc

- **Appendix:**
  - Add exhibit materials etc post exhibit
    - Exhibit materials
    - • Any materials produced as part of the exhibit display should also be submitted for review. This includes digital copies of any handout or poster material, and can also include links to interactive resources, or video material if this was included to help explain the project.
  - Update meeting log appendix
  - Include all prototype materials created
    - This submission should also include any materials that would be used by a team charged with implementing the solution, e.g. the low/medium-fidelity prototypes and other items developed to test aspects of the proposed design.

10.11 Iteration Three Prototype Evaluation User Testing Plan

The following user testing plan showcases the studies that will be conducted to gain suggestions and feedback on the prototype concept design, specifically looking at two key testing goals as outlined below.

Key Activities:

- Qualitative Interviews

Key Users:

- Primary school students aged 5-7 years and their Teachers - a minimum of two interviews to begin with

Equipment:

- Communication technology, equipment to record data, concept sketches

Interview

1. Introduce the team's project, problem space and theme.
2. Ensure the user is happy to proceed with the interview.
3. Begin asking the following questions.
4. Add/ask any additional questions you think would be useful for the interview.
5. Record responses with a transcript and add all raw data to 10.11 Iteration Three Prototype Evaluation User Testing Plan

Test 1 Goal: Which is better, role model or reactive/emotive response?
Scenario 1: (*show two Tiger images - first Timmy asleep and then Timmy upset)* Your class just came in after lunch and Timmy the Tiger is asleep, but your classroom is very noisy and he wakes up, and Timmy starts crying and goes blue.

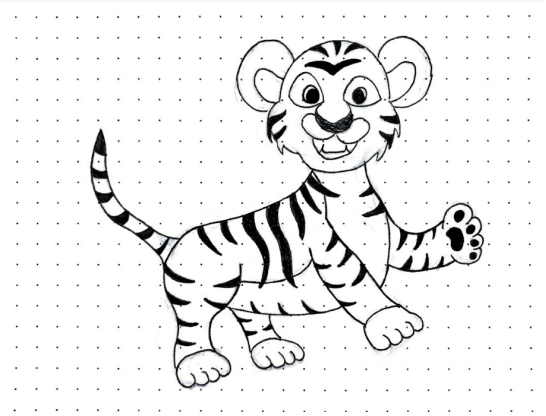
Disruptive Classroom Transition Times

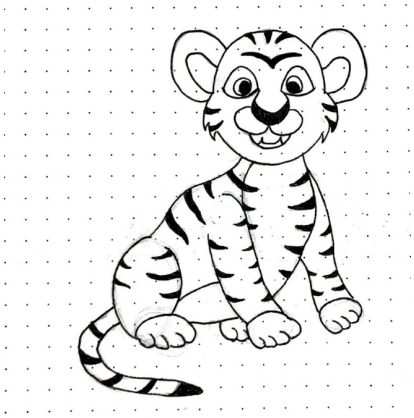
Question 1: How would you think you/your class would react to this being shown?

Question 2: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

Scenario Continued: After your class quietens down, Timmy gets happy and green.

Scenario 2: (*show two Tiger images - Timmy as a role-model walking into class and sitting)*
Your class just came in after lunch but your classroom is very noisy. Timmy starts role-modelling how you should enter the class (also show video).





Question 3: How would you think you/your class would react to this being shown?

Question 4: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

Question 5: Which one of these two scenarios made you more likely to settle down and transition into learning?

Test 2: Which avatar is better - class friend or class pet?
Show the 2 videos of each movement break (see video links on discord) + Think Aloud

Question 6: Which avatar do you think would be more helpful for you and your class to help you transition and settle into learning? Why?

Question 7: Which one did you find more interesting? And why?

Question 8: What are some class pet/animals you think would work well as an avatar for your class to help you during transition time?

Question 9: Which class pet/avatar would you not help with transitioning? Why?

10.12 Iteration Three User Testing Results

Interview Raw Data Transcripts are provided below.

10.12.1 User 1: Primary School Teacher

Test 1 Goal: Which is better, role model or reactive/emotive response?

Scenario 1: (*show two Tiger images - first Timmy asleep and then Timmy upset)* Your class just came in after lunch and Timmy the Tiger is asleep, but your classroom is very noisy and he wakes up, and Timmy starts crying and goes blue.

Question 1: How would you think you/your class would react to this being shown?

- The students will be concerned for the tiger and feel for the tiger. They would want to help the tiger so they would tell each other to be quiet and “shh” the tiger is upset. There might be a few who don’t want to listen and the other classmates will encourage them to please be quiet so the tiger is not sad. Then the class will work together to be quiet.

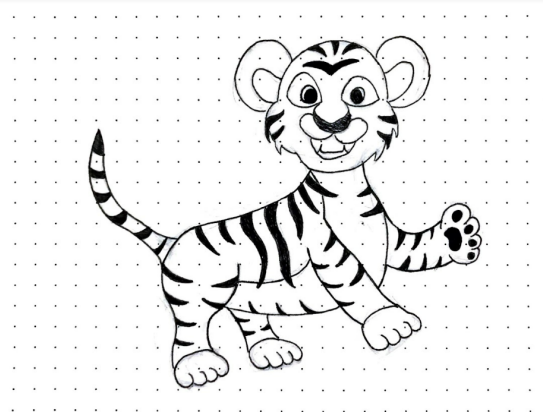
Question 2: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

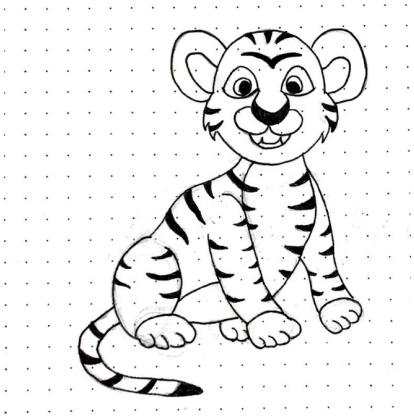
- Yeah because the class knows the tiger and they want to help the tiger feel happier and relax - this will encourage students to relax and be quiet and calm. It makes them aware of their own noise levels.

Scenario Continued: After your class quietens down, Timmy gets happy and green.

- I think this is a really good reward the class receives when they are quiet and they will feel more united and see that they can work together to help the tiger and this is an achievement they would be proud of as a class.

Scenario 2: (*show two Tiger images - Timmy as a role-model walking into class and sitting)*
Your class just came in after lunch but your classroom is very noisy. Timmy starts role-modelling how you should enter the class (also show video).





Question 3: How would you think you/your class would react to this being shown?

- It would be a fun way for the class to learn and listen - so the class would engage and observe the tiger - this would help the class to follow the tiger's example and walk in quietly.

Question 4: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

- Yes

Question 5: Which one of these two scenarios made you more likely to settle down and transition into learning?

- A combination of both would be best - the second one shows how to act but the first one will relate to the students' emotions and is important as it conveys personality and mood which will be very effective in raising awareness of the classroom noise level and encouraging the class to quieten down.

Test 2: Which avatar is better - class friend or class pet?
Show the 2 videos of each movement break (see video links on discord) + Think Aloud

- I really liked 2 - the tiger - the movement break after entering the class should be non-physical as the students have been moving - so physical activity should be used only between lessons - so I really liked the tiger break with deep breathing, something to calm the kids as they've been walking and running outside and have just entered the classroom, it's time for their bodies to calm down to a seated situation. Having the tiger also say the instructions out loud is important as some children may not be able to read well. I really liked the tiger breathing. I did find the video too fast though and

the music was too upbeat for calming down, I liked the imagery though. The music should be slower.

Question 6: Which avatar do you think would be more helpful for you and your class to help you transition and settle into learning? Why?

- The animal definitely - it's more fun for the kids and they really enjoy animals - this will get their attention much better if a character is used over a human being as they are listening to a human being, a teacher, all day.

Question 7: Which one did you find more interesting? And why?

- The tiger one - the first one wasn't useful as the kids just came into class, they don't want to move again. Also an animal is much more engaging.

Question 8: What are some class pet/animals you think would work well as an avatar for your class to help you during transition time?

- Giraffe, elephant, hippo, camel, crocodile, shark, whale, turtle, monkey, toucan, rainbow lorikeet - a few different types of animals - some birds, reptiles, mammals, amphibians like frogs, fish.

Question 9: Which class pet/avatar would you not help with transitioning? Why?

- No not really - any animal will work good as the animal will be in it's calm state

10.12.2 User 2: Year 2 Student (7 years old)

Test 1 Goal: Which is better, role model or reactive/emotive response?

Scenario 1: (*show two Tiger images - first Timmy asleep and then Timmy upset)* Your class just came in after lunch and Timmy the Tiger is asleep, but your classroom is very noisy and

he wakes up, and Timmy starts crying and goes blue.

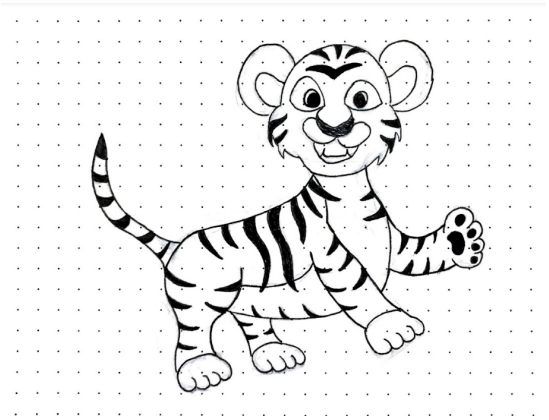
Question 1: How would you think you/your class would react to this being shown?

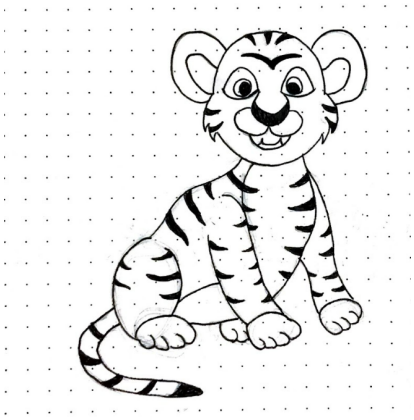
- I'd feel sad that the tiger woke up and I want to help him go back to bed as he's sad and I'd tell my friends to be quiet too so the tiger can sleep.

Scenario Continued: After your class quietens down, Timmy gets happy and green.

- I'd get happy when it's happy.

Scenario 2: (*show two Tiger images - Timmy as a role-model walking into class and sitting)*
Your class just came in after lunch but your classroom is very noisy. Timmy starts role-modelling how you should enter the class (also show video).





Question 3: How would you think you/your class would react to this being shown?

- The tiger is doing the right thing and listening and I like to be like that and listen to my teacher as she's nice.

Question 4: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

- Yes

Question 5: Which one of these two scenarios made you more likely to settle down and transition into learning?

- I like when it cried cause it was funny and cool.

Test 2: Which avatar is better - class friend or class pet?
Show the 2 videos of each movement break (see video links on discord) + Think Aloud

Question 6: Which avatar do you think would be more helpful for you and your class to help you transition and settle into learning? Why?

- I liked the tiger more cause it was funner to look at and cuter and it was really cute when it was breathing so I liked that.

Question 7: Which one did you find more interesting? And why?

- I liked watching the tiger breathe.

Question 8: What are some class pet/animals you think would work well as an avatar for your class to help you during transition time?

- I love koalas and I love dogs, bunny rabbits and cute kittens.

Question 9: Which class pet/avatar would you not help with transitioning? Why?

- I don’t like snakes.

10.12.3 User 3: UQ Education Student

Test 1 Goal: Which is better, role model or reactive/emotive response?

Scenario 1: (*show two Tiger images - first Timmy asleep and then Timmy upset)* Your class just came in after lunch and Timmy the Tiger is asleep, but your classroom is very noisy and he wakes up, and Timmy starts crying and goes blue.

Question 1: How would you think you/your class would react to this being shown?

- I think the class would kind of react to this like him waking up more than he,the sleeping tiger. They'll try and probably try to quiet around, but yeah, if the rowdier kids enter first, it becomes a little more of an issue as I think because they're not gonna worry too much about Timmy and his sleeping.

Question 2: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

- I think it will help them be quiet and settle and focus but it'll have to depend on the class.But I definitely don't think it'll hurt and this will only help the class.

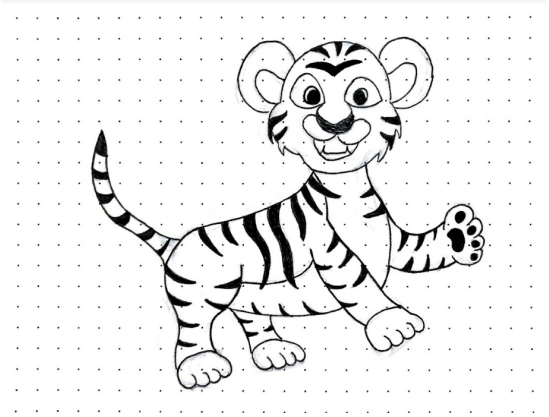
Scenario Continued: After your class quietens down, Timmy gets happy and green.

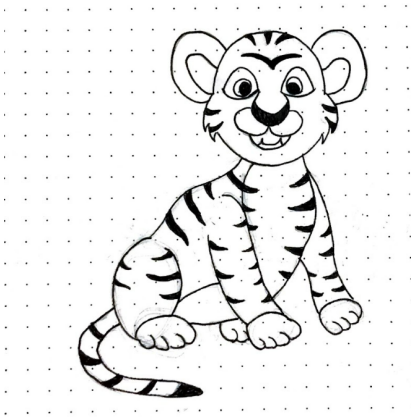
- I'd get happy when it's happy.

Question 2 continued: how do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

- I don't think it's necessary to have him say stuff, mostly because the teacher will be up front saying stuff. I think having him do like a little thumbs up would probably be about as far as you go. Positive enforcement

Scenario 2: (*show two Tiger images - Timmy as a role-model walking into class and sitting)*
Your class just came in after lunch but your classroom is very noisy. Timmy starts role-modelling how you should enter the class (also show video).





Question 3: How would you think you/your class would react to this being shown?

- They take the piss out of it. Especially with kids that young having a role model, They will exaggerate it and take it a bit further than it is. I think having positive reinforcement with the colours and that sort of stuff will probably be better.

Question 4: Do you think this would help you/your class settle and focus on the upcoming activity and transitioning.

- I don't think I'll settle focus

Question 5: Which one of these two scenarios made you more likely to settle down and transition into learning?

- Definitely the first one. Something that kids can empathise with more so than a role model especially for that young age, is I think is more important and effective.

Test 2: Which avatar is better - class friend or class pet?
Show the 2 videos of each movement break (see video links on discord) + Think Aloud

Question 6: Which avatar do you think would be more helpful for you and your class to help you transition and settle into learning? Why?

- Timmy, absolutely timmy the tiger, like, having just a regular dude, I think especially with younger kids and you can look at like, a lot of, for example movies, kids tend to empathise more with anthropomorphic creatures. Don't ask me why, I have no idea why they do but they do. I think it makes it easier to kind of depersonalise and helps them focus on what's being explained.

Question 7: Which one did you find more interesting? And why?

- I mean I found the human more interesting, because of how silly they look and act, But in terms of educational standards, like I said earlier, anthropomorphic animals are more engaging pets and easier to empathise with kids.

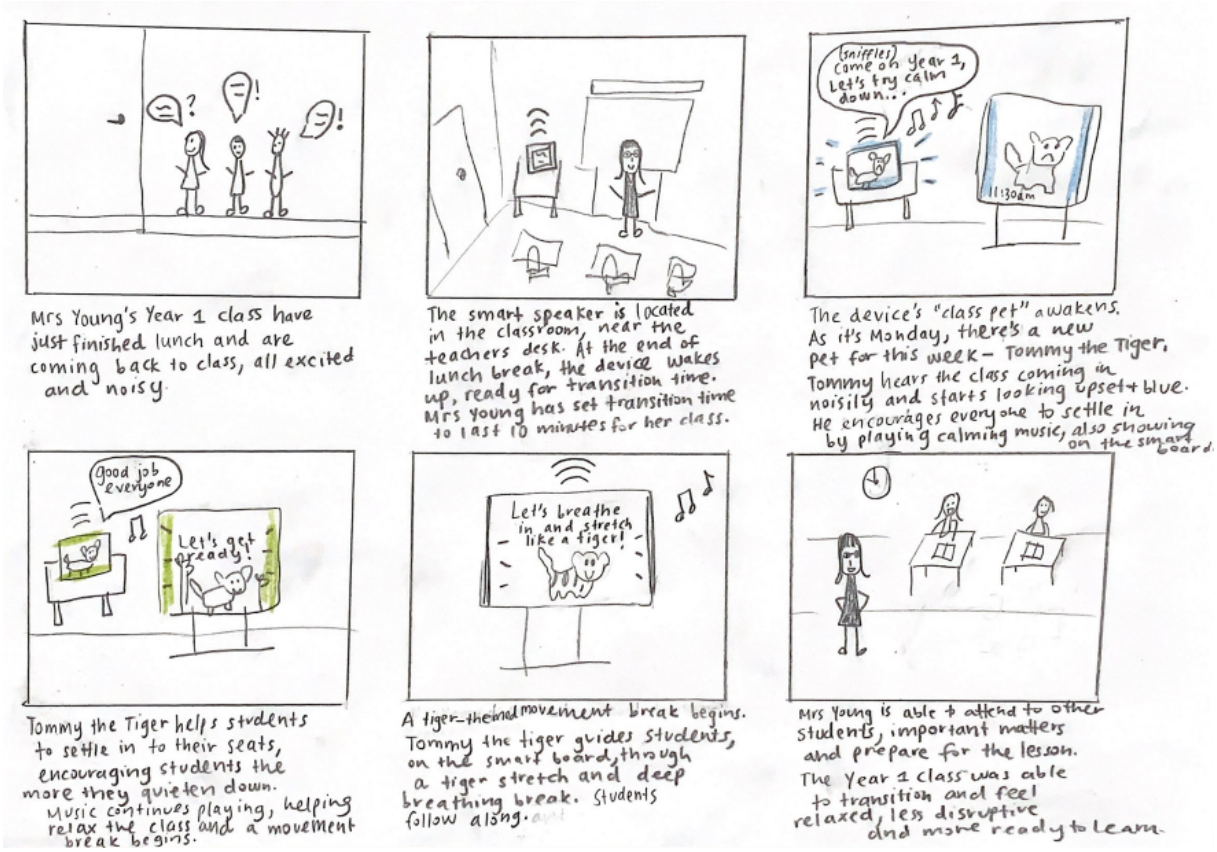
Question 8: What are some class pet/animals you think would work well as an avatar for your class to help you during transition time?

- I think Timmy the tiger is a good one. You could do like other jungle / savannah animals like Leo the lion, Ellie the elephant, stuff like that. But I think with the prominence of Tigers in children's media, Timmy is a good choice.

Question 9: Which class pet/avatar would you not help with transitioning? Why?

- A bird or an insect or something like that? Like, if you're looking at like an anthropomorphic birds like a flamingo, you're like damn, that is a stick with feathers crazy and if you're looking at an insect up close they'll be freaked out. I think they're just too far into the animal kingdom. I think you want to have something similar to dogs and cats or psychiatrists more often present in kids media.

10.13 Original User Storyboard



User Storyboard Paper Sketch

10.14 Causes of Disruptive Student Behaviour

The background research detailed below gives more information regarding the causes of disruptive behaviour as provided in the first revision of this report, which was revised as it speaks in regards to causes of disruptive student behaviour that occurs more generally throughout class lessons, and less so during transition times. As a result of feedback, this information is less applicable, as we have focused our attention on the problem of student disruptions during classroom transition times. What is provided below are how the specified sections were originally written.

Home and Family Environment

A difficult home environment can be linked to increased negative and disruptive student behaviour (Vereen, 2020). Children experiencing stressful, traumatic and overwhelming issues at home, including poor parenting, family issues and a chaotic personal environment characterised by disorderly living routines, overcrowding and noisy living spaces can lead to heightened stress and increased restlessness and poorer language choices in the classroom (Jaffee et al., 2012). Harsh and toxic home environments, including abusive family situations, changes in family structures such as divorce or bereavement as well as economic challenges, housing issues and poverty (Bennett, 2013), create feelings of neglect and stress in children and are consequently correlated with increased levels of student disruption, demotivation and reduced academic achievement (Schwartz et al., 2013).

Learning Difficulties

Learning difficulties and intellectual disorders are closely linked to classroom disruption. Students with various learning and communication challenges, including those with dyslexia, speech and language issues, may find it difficult to engage with curriculum content and be struggling to understand theoretical material and teacher instructions. This can, in turn, lead to students misbehaving or disrupting the rest of the class, including exhibiting avoidance, aggression, social isolation as well as strong emotional outbursts (Gaddad, 2014). Research suggests up to 52% of children with learning difficulties express challenging behaviour (Diakakis et al., 2008), often related to heightened frustration and anxiety as a result of reduced self-confidence.

Sensory, Health and Behavioural Issues

A range of sensory, health and behavioural issues can also cause classroom disruptions (Child Mind Institute, 2021). This includes students with special needs, Autism, ADHD, anxiety issues as well as other psychological challenges and sensory disabilities which limit how children perceive the world around them and can cause increased confusion, miscommunication and difficulty responding to school requirements (Higgins, 2020). Students with sensory and behavioural disorders and those with impaired hearing or vision,

may find classroom environments challenging and difficult to remain focussed in, increasing levels of inattentiveness, inappropriate behaviour and emotional outbursts (Oldfield, 2012).

Boredom

Student disengagement and disruption can also be associated with students experiencing feelings of boredom and disinterest in class content. This may particularly be due to gifted students not feeling challenged-enough with class content or finding lessons too easy. This can lead to some students feeling frustrated and unmotivated during class (Livingstone, 2015). Boredom can cause increased levels of anger, hopelessness, fatigue and overall, disengagement, which can disrupt other students in the class and cause teaching distractions (Jason, 2017).

Learned Behaviour and Lack of Routine

Children can also develop and mimic negative learned behaviours and patterns from friends, peers, family members and media influences, including abusive verbal language, answering-back, teasing and other forms of immoral behaviour (Rymanowicz, 2015). This can lead to students perceiving these behaviours as normal and acceptable practices to display in the school classroom, leading to other students potentially also developing such negative habits (The Royal Children's Hospital Melbourne, 2018). Excessive use of social media and online platforms can negatively influence children (Cronan, 2021) to develop poor social habits due to a lack of positive role models (Townsend, 2013). In addition, a lack of basic care and routine in a student's personal life due to a poor diet or sleep routine, can also lead to increased disruptive behaviour at school, especially in terms of struggles with fatigue, hunger and restlessness (Higgins, 2020).

Classroom Environment

The school and physical classroom environment can play an important role in influencing the level of student disruption (Obaki, 2017). Excessive classroom noise, sensory disruption, lighting issues as well as uncomfortable classroom temperature and seating can distract students and cause them to make more noise and misbehave. Disorganisation in the classroom and a lack of order can increase the likelihood of students becoming restless, excessively moving around and ignoring teacher remarks (Guardino & Fullerton, 2010). A classroom's seating arrangement as well as the number of students in a class can also determine whether or not disruptions will be an increased distraction (Unlu, 2017).

10.15 Solution Space

The background research detailed below gives more information regarding the project's solution space and current technologies.

Reducing Disruptive Student Behaviour

Numerous classroom behaviour management strategies have been implemented by teachers and educational institutions in schools across the nation. These management techniques focus on minimising, preventing as well as dealing with disruptive behavioural patterns in school children and range from simple classroom teaching strategies to more complicated learning frameworks that target student behaviour and assist in reversing key negative student behaviours in order to foster positive behavioural change (Arbuckle & Little, 2004).

Behavioural Systems and Classroom Rules

Various school and classroom-wide behavioural techniques and rules are implemented to prevent and deal with disruptive student behaviour. These strategies focus on highlighting negative behaviour and punishing students who regularly misbehave. Classroom rules and codes of conduct further reinforce to students the correct ways to behave in simple and positive terms. Furthermore, classroom rewards and incentives for students that behave in a positive manner are commonly used to attract pleasant student behaviour. These strategies are simple and direct and focus on individual student actions through disciplinary means (NSW Government, 2021).

Positive Classroom Discipline

Positive discipline is fast becoming a leading form of classroom behaviour management and education (Nelsen, 2022). It consists of guiding children to understand acceptable forms of behaviour through gentle and nurturing commands, less so focussed on negative behaviour and more focussed towards highlighting positive actions (Yussif, 2021). This has been found to be highly effective in assisting students to develop and maintain positive behaviour in classrooms through positive reinforcement, redirection strategies and encouragement. One such example currently used is *Positive Behaviour for Learning (PBL),* a framework used in schools across the nation, aimed at encouraging positive behaviour and developing safe and secure classroom environments (Queensland Government, 2020).

Positive Learning Centres

Positive Learning Centres are an intervention program used by the Queensland Department of Education to support school students that require intervention and behavioural management support. These centres focus on educating and assisting students to develop positive behaviours through the encouragement of appropriate educational staff, improving overall student discipline (Queensland Government, 2018).

Moral Education

Moral and values-based education is a powerful tool used in some schools to develop positive qualities in students (Ryan, 2022). It focuses on educating values and beliefs to students, particularly surrounding actions that are right and wrong (Halstead, 2010). This helps to demonstrate to students what behaviours and characters, or morals, are acceptable and needed in a classroom or societal setting (Trivedi-Bateman, 2020). One example of a specific strategy implemented is *The Virtues Project*, a global framework and initiative used to inspire and cultivate character and good qualities or "virtues" in everyday life and in the classroom, such as kindness, patience, love and unity (The Virtues Project, 2022). This supports students to see their potential as limitless and be encouraged to develop strong values to help their friends, teachers as well as the wider world around them.

Noise Management

Another strategy of significance in managing student disruption is noise management. This is crucial in helping to calm and stabilise the classroom environment and minimise distraction to the learning at hand. Reducing noise in the classroom is highly beneficial in helping to increase the quality of teaching for students and reducing teacher frustration (Parsonson, 2012). Several examples of managing and reducing classroom noise have been successful in enhancing learning effectiveness. This includes a study conducted to control the intensity of noise in a classroom, where a device tracking the classroom's level of sound was used to output students' favourite music when levels of sound were acceptable. If the classroom's noise exceeded desirable levels, the music would consequently stop playing (Wilson & Hopkins, 1973).

Reducing Disruptive Transition Times

Teachers use several strategies to reduce disruptive behaviours during transition times and encourage students to settle down and prepare for the learning sessions to come.

Direct Instruction

According to a study by Mercer & Mercer (1993), for young children, teachers can teach students through direct instruction during transition time, including by directly demonstrating to students how to sit down and get out their learning materials.

Organisation

Lenz (1982) stated that teachers can also use advanced organisers to detail a list of activities that will be done in the next lesson, including materials, routines, expectations, background information and tasks, aiding students to feel more prepared for the upcoming learning session.

Physical Cues and Movement

Buck (1999) suggested using a physical cue, such as raising arms and saying ‘class is now starting’ to signify the beginning of a new lesson. Students may forget it is inappropriate to talk during a new lesson and thus, in this way, physical cues can be beneficial. Certain movements are used to help students remember rules and expectations change across different situations. Furthermore, signalling transition time has begun through activities including music, switching the lights on or off, singing a song and asking the students for their attention are other beneficial strategies that assist teachers to maintain classroom engagement and minimise excessive disruptions (Stacho, 2013).

Visual Timer

A visual timer can be helpful for students to ‘see’ how much time remains before the next activity. Time concepts are abstract (e.g., ‘a few minutes’), difficult to understand literally (e.g., ‘just a second’ or ‘in a minute’), especially if time-telling is not a learned ability. Visually presenting information about time can help to make concepts more understandable. According to research, using a visual timer helped students with autism effectively transition from computer time to work time at various intervals throughout the day (Dettmer, Simpson, Myles, & Ganz, 2000). This timer has a red portion that indicates the amount of time left. As the time limit expires, the red part vanishes.

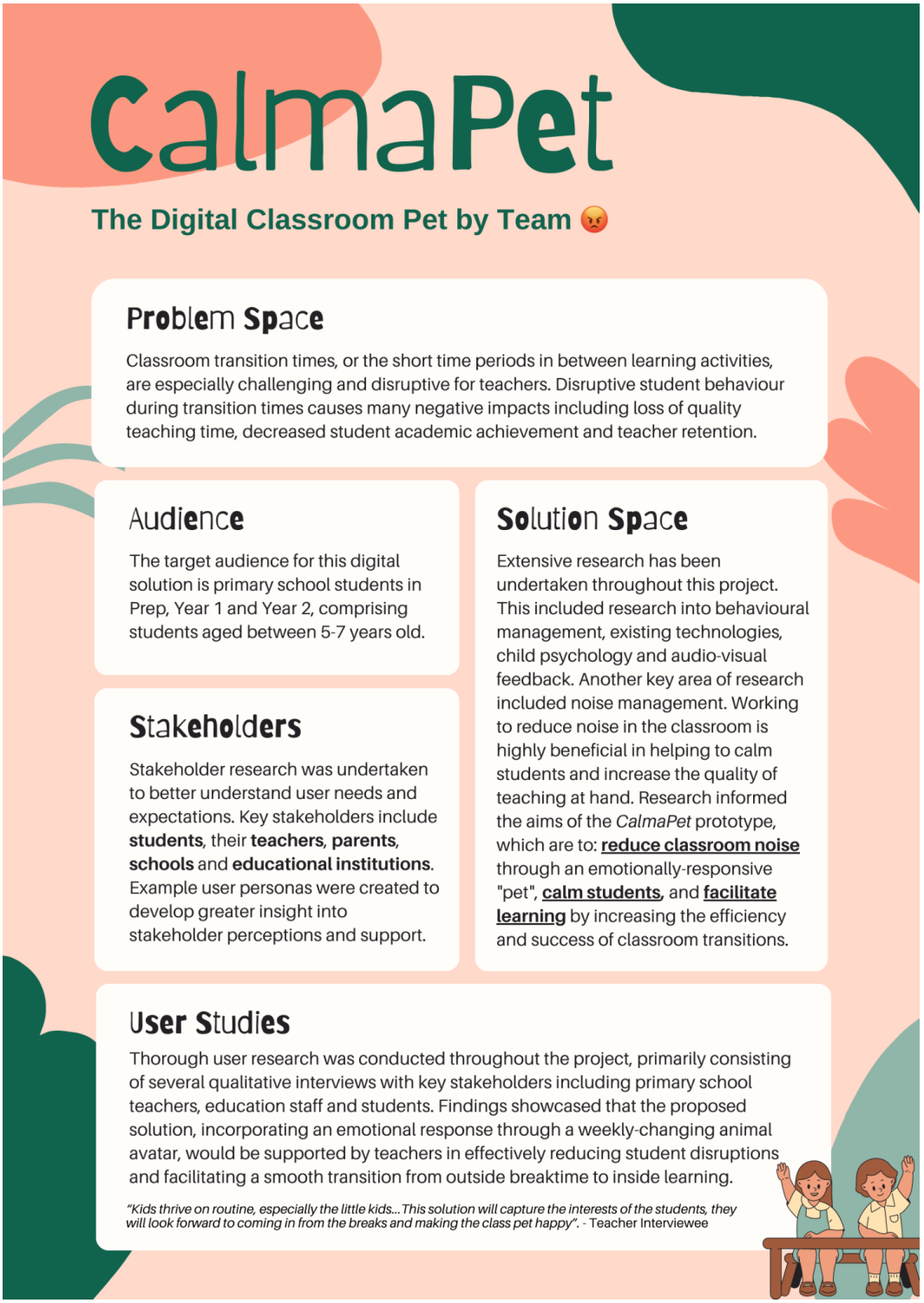
10.16 Exhibit Prototype Slides

10.16.1 Prototype 1

10.16.2 Prototype 2

10.17 Exhibit Posters Full size

10.17.1 Research Poster (product info)



10.17.2 Design process Poster (product info)

Design Process

DESIGN PROCESS FOR CALMAPET BY TEAM 😵

1 Problem Identification & Possible Solution

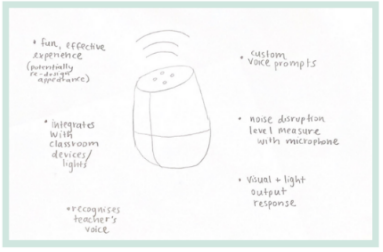
- **Problem:** Disruptive Student Behaviour (verbal disruptions)
- **Solution Idea:** Smart Speaker System to detect & manage classroom verbal disruptions

2 Initial Research

- Background research & literature review
- Identifying stakeholders
- Stakeholder research

3 Conceptual Model & User Research

- Defining the conceptual model
- Designing LoFi prototype - paper sketches of possible solution design idea & context of use
- User interview with a primary school teacher
- User research analysis



4 Problem Focus Shift

- Addressing Feedback
- **New Problem Focus:** Disruptive Classroom Transition Times
- Shifting from disruptive behaviour management to prevention

5 Research & Revisions

- Researching classroom transition times & disruptive behaviour during transition times
- Revising & narrowing down the target user group & stakeholders
- Research into child psychology & design considerations for solution features

6 Concept Iteration, Prototyping & User Research

- **Iterated Solution:** Smart classroom device with integrated visual display & sound system to help facilitate classroom transition times & prevent disruptive behaviour
- Designing prototypes - sketch of redesigned concept & its features
- User interviews with primary school teachers & education student
- User research analysis

7 Concept Refinement & Reflections

- Creating digital designs of the concept solution
- Reflecting on the project direction & team process

8 Prototyping & User Research

- Designing prototype materials - digital & hand-sketched paper prototypes of screens & video prototypes of movement breaks
- User interviews with prototype materials with a primary school teacher & student
- User research analysis

10.17.3 Prototype Poster (product info)