Implementation of a TTRPG in higher education to support social skills development of learners with ASD to positively influence student well-being

DESIGN PLAN

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Introduction

Background

Studying in higher education should be a time for self-development and growth on both a professional and personal level. Think academic performance, development of professional behavior, social skills, integration in society, and satisfaction in life. To do so, students need to experience a positive state of well-being (Gräbel, 2017; Samuel et al., 2013)**.**

> *"Well-being is the experience of positive emotions, feeling engaged in activities, having good relationships with other people, finding meaning in one's life and experience a sense of accomplishment in the pursuit of one's goals" (Seligman et al., 2009).*

However, not all students experience a positive state of well-being during their time in higher education. Students with Autism Spectrum Disorder, are among the students who experience a negative state of well-being (Dijkhuis et al., 2017; Van Heijst & Geurts, 2015). Research shows that the lack of well-being is caused by difficulties experienced with social-emotional skills, such as working together in groups, asking questions, striking up conversation, and a lack of awareness of social problems (Cai & Richdale, 2016; Dijkhuis et al., 2017; Nederlandse Vereniging voor Autisme, n.d.; Starr et al., 2003; Valérie Van Hees , Tinneke Moyson, Ph.D. & Herbert Roeyers, 2018; Volkmar et al., 2017). This results, not only in poor academic achievement and slower progression rates, (T. C. Bakker et al., 2020; Comer & Comer, 2019; Shattuck et al., 2012; Welsh et al., 2001), but also cause negative peer interactions (Yasamine Bolourian et al., 2018; Locke et al., 2010), an increase in social anxiety (Bellini & Peters, 2008), feelings of loneliness and isolation (Bauminger et al., 2003; Humphrey & Symes, 2010; Locke et al., 2010), and a decrease in self-esteem (Tantam, 2000) which are components that negatively affect their sense of well-being (Calder et al., 2012; Garrison-Harrell et al., 1997; Locke et al., 2010; Welsh et al., 2001). It has been noted that these students do not lack the intelligence to study in higher education, nor the willingness to learn (T. Bakker et al., 2019; T. C. Bakker et al., 2020; Dijkhuis et al., 2017; MacLeod et al., 2018; Van Heijst & Geurts, 2015).

In an interview student's with autism stated:

> *"There were some people that were making fun of me, several classmates at [university] put me to the side, whether through ignoring me, spreading rumors about me, or not trusting me as a valid partner for projects. I don't get it, I don't know what I am doing wrong, if I try approaching them friendly then people don't seem to bother most of the time."*

> *"Making friends was hard but once I had a small social group it was the best I've ever experienced."*

> *I had a fair number of negative experiences with teamwork in both college and higher education Oftentimes, this came down to communication and reaching consensus. I do not want to get isolated or ostracized, yet on occasion I did run into disagreements I couldn't voice because of that.*

It has been shown that when students experience a positive sense of well-being, their academic performance goes up, but the opposite is also true; students who experience a lack of well-being will see a negative effect on their academic performance (Gräbel, 2017). Combine that with the fact that less than 40% of students with ASD in higher education actually graduate (Yasamin Bolourian et al., 2019; Comer & Comer, 2019; Shattuck et al., 2012), shows that there is a problem in higher education that deserves looking into.

Relevance

The way higher education is designed, doesn't always fit every type of student (Jansen, 2021b, 2021a)**, but it is the job of education to ensure that each student receives the opportunity to achieve their goals in higher education and become ready professionals for the work field. Studies show that both higher education and the work field require young professionals to be adept at skills such as; communication & collaboration, critical thinking & problem solving, planning & organisation, flexibility, and emotional intelligence (Ackerman, 2020; Blair & Cybele Raver, 2015; Cai & Richdale, 2016; Jansen, 2020; Luksha et al., 2018; World Economic Forum, 2020), which are the exact skills that students with ASD struggle with due to executive functioning disorder (Dijkhuis et al., 2017; Van Heijst & Geurts, 2015).**

Several researchers state the need for targeted interventions in higher education that focus on the development of social skills, to improve the well-being and academic performance of students with ASD (Adreon & Durocher, 2007; Attwood, 2000; T. C. Bakker et al., 2020; Yasamine Bolourian et al., 2018; Durlak et al., 2011; Rao et al., 2008; Shattuck et al., 2012; Valérie Van Hees , Tinneke Moyson, Ph.D. & Herbert Roeyers, 2018; White & Roberson-Nay, 2009).

However, many teachers in higher education lack the knowledge or training to support students with ASD (Hendrickson et al., 2017; Swift, 2012). Research stated that a strength based approach would be ideal when it comes to educating students with ASD (Grandin, 2007; Mottron, 2011). When interests and strengths are combined in the learning environment it will not only increase the impact of learning, but also create deeper engagement for the student. Engagement is even more important for learners with ASD as it helps set a foundation for the development of skills and disposition which are essential to increasing well-being (Carini et al., 2006; Grandin, 2007). This requires from the educational professional to adapt their teaching methods (Department of Education and Early Childhood Development, 2012; Dochy, 2018). Educational professionals should practice the principles of strength-based education themselves when diving into the role of a coach while students are learning to put their strengths to work in both learning and social situations (Lopez & Louis, 2009a)

There are several components in this study that should be taken into account when developing an intervention; the students need support in the development of social skills to improve their sense of well-being and subsequently their academic performance, the teachers need support and guidance on how to apply a strength based approach when supporting these students, and an intervention needs to be designed that will combine both aspects.

Purpose of the study

This study has been conducted to aid in the design process of an innovative and playful solution in the form of a table top role playing game by the name of "the sisters of nature". This intervention has been designed to help students with ASD develop their social skills through engaging play while being supported in their development by a coach and giving said coach practical guidance on how to support the social skills development of the students with ASD.

Theoretical Framework

Strength based learning

Developing one's strengths is essential for success in study and in life (Lopez & Louis, 2009a; Reynolds et al., 2020). Grounded in positive psychology (K. Bowers, 2009; Seligman et al., 2009), the strength-based learning approach aims to help each individual to recognize and act on their strengths (Reynolds et al., 2020) which results in higher levels of engagement, and boost well-being and academic performance (Anderson, 2006; K. M. Bowers & Lopez, 2010; Cornwall, 2018; Grandin, 2007; Lopez & Louis, 2009a; Louis, 2008; Stebleton et al., 2012). This educational approach is particularly effective for students with learning difficulties such as autism spectrum disorder, as it helps the development of social-emotional skills (Grandin, 2007; Pedaste et al., 2015).

To apply a strength-based approach it is important for educators to intentionally discover their own talents, to apply their strengths in their daily work, to continuously improve and to establish activities to help students discover their talents and apply their strengths while learning knowledge, acquiring academic skills and 21st century skills while demonstrating their learnings in educational and social settings (Lopez & Louis, 2009a; Sebastian, 2017).

Principles of strength-based learning
Strength-based learning is grounded in several principles. Although researchers categorize them differently, the principles come down to the following six principles.

An understanding of student's strengths
Each student needs to gain insight into their own strengths, but in a strength-based approach it is also important for the educational professional to understand the talents of their students in order to help them apply these strengths in and outside of the classroom. By understanding the talents of the students, the educational professional can help them reflect on how to use these strengths outside of the direct learning environment (K. M. Bowers & Lopez, 2010; Carey, 2004; Lopez & Louis, 2009a; Reinert Center for Transformative Teaching and Learning, 2016).

Since people with Autism Spectrum Disorder are more often identified by their weaknesses instead of their strengths this can become difficult (Cosden et al., 2006). Understanding the strengths of students with Autism Spectrum Disorder will lead to educational professionals being better at giving support. Research suggest to use visual aids and discussion to help students with ASD identify their strengths. (Teti et al., 2016)

A personalized learning experience
The learning environment needs to connect to the individual needs and interests of the student to create an environment in which development can take place (Katō, 2019; Steenbergen-Penterman et al., 2008; Zacarian et al., 2017). In a personalized learning experience, it is important to allow room for choice as to how to demonstrate their strengths within the program or intervention. Feedback from the coach or teacher is needed to address the development and application of strengths when it comes to pursuing goals (Lopez & Louis, 2009a). If the learning environment matches the needs and interest of the students, students with Autism Spectrum Disorder more freely demonstrate their talents and will also find conversation and interaction more enjoyable (Katō, 2019).

A social environment
Learning takes place in a dynamic and interactive environment (Dochy, 2018; Veenker et al., 2017) and within the strength based approach it is important that programs or interventions allow for learning in smaller groups (Dochy, 2018; Lopez & Louis, 2009a; Zacarian et al., 2017). Working together and developing relationships in groups also directly influence well-being (Lopez & Louis, 2009a; Seligman et al., 2009) and while students are discovering their own strengths

in a group setting, they can also share these findings with each other, learn how to work together better and provide each other with feedback. Over time, in this setting, students could even start to analyze how strengths of others could manage their weakness, creating so-called strength collaborations (Lopez & Louis, 2009a).

A growth mindset
In applying a strength-based approach it is important that the environment supports and affirms the strengths of the individual student, be it peers of teachers to help develop a growth mindset that focusses on positive development (K. M. Bowers & Lopez, 2010; Zacarian et al., 2017). According to renowned psychologist and researcher Carol Dweck (2017), the growth mindset helps students believe in their abilities, helps them embrace challenges, see their own value through positive feedback and inspires them to do more.

Important to keep in mind in a strength based approach, is to always set goals for the future, utilizing strengths to continue development and to avoid a fixed mindset where the student might think they have learned enough which could result in a decline in motivation and performance (Asuza Pacific University, n.d.; Louis, 2008).

Deliberate application of strengths
Important in a strength-based approach is for the educator to apply the strength-based approach themselves, by finding new didactical methods that are enhanced by their strengths and to show a continuous growth mindset while teaching students (Dweck, 2017; Lopez & Louis, 2009a). The job of the educational professional in this approach is to identify and highlight the strengths of the students to increase self-awareness, while the students are applying them to in occasions such as completing assignments. This is done by creating opportunities for the students to apply their strengths too, such as choice in assignments or practice situations which can take place in smaller increments, such as a day or a longer period of time, such as a semester or a schoolyear (Lopez & Louis, 2009b).

Reflection
In a strength-based approach, reflection becomes an important principle. Highly effective educational professionals help students reflect on their own responsibilities, on their developing strengths and talents and on their engagement in programmes, interventions, or activities. Through reflection in application of their strengths, students will start to understand how to use their strengths to their benefits in both academic challenges and social situations (Lopez & Louis, 2009a; Louis, 2008)

Collaborative learning

As strength-based learning partially drives on interaction in groups to enhance well-being and academic performance, collaborative learning should be implemented in the intervention. Collaborative learning focusses on the development of non-foundational knowledge and social skills such as communication, collaboration, reasoning and critical thinking, through active knowledge-sharing and co-creation of new skills and knowledge (Dochy, 2018). This educational method has proven to be an effective method for students with Autism Spectrum Disorder to promote the development of social skills. Other benefits of collaborative learning for this target audience are an increase in student engagement, academic performance, motivation, high quality relationships and self-esteem which simultaneously benefit a student's well-being. (Dugan et al., 1995; González & Merino, 2016; Johnson & Johnson, 2009)**.**

Several other researchers state consistently that students who learn in teams outperform students who learn individually in cognitive and moral reasoning, time-on-task, long-term retention, intrinsic motivation, expectations for success, creative thinking and the transfer of the learned knowledge and skills into real life (Bowen, 2000; Dochy, 2018; Johnson & Johnson, 2009; Kyndt & Baert, 2013).

Principles of collaborative learning

ASD is a complex spectrum disorder, characterized by a deficit in social skills (McPartland et al., 2016). Collaborative learning opens opportunities for interaction when these students are being supported by their environment. A supportive environment helps the student overcome learning challenges by being accepted for their contributions within the group (Grenier & Yeaton, 2019). Collaborative learning, like strength-based learning focusses on several principles to enhance learning.

A positive learning environment

Cooperative learning provides students with the opportunity to engage with other peers in an environment that is designed to foster support. To promote student learning, a positive learning climate needs to be established, through openness, honesty and trust (Autism Speaks, 2008; Dochy, 2018; Grenier & Yeaton, 2019). Giving recognition and praise on desirable behaviours also help the team identify areas of improvement in a positive manner. This also helps to manage expectations and to focus on individual growth and competence (Autism Speaks, 2008; Dochy, 2018; Dweck, 2017). Positivity and shared responsibility within a group helps to create equal peer relationships, especially among students with learning disabilities, such as autism (Dyson & Casey, 2012; Grandin, 2007)

Individual accountability

By setting out tasks for the students to accomplish and by creating clear roles within a group, individual accountability gets established (Zacarian et al., 2017). These clear tasks can help promote student engagement, but also make it easier for students to listen to each other and practice working together. Gonzales & Merino (2016) state that the effects of collaborative learning are increased when group goals and individual accountability are implemented.
Having small groups with clear roles, goals and set out tasks creates more individual accountability for students with Autism Spectrum Disorder. Together with the group, rules for working together can be set out to encourage team consensus and keep an eye on both individual and team goals. This is an effective method to encourage individual participation (Dochy, 2018; Grenier & Yeaton, 2019).

Face-to-face interaction

An important factor in both strength-based learning and collaborative learning is the need for interaction to stimulate the learning process. This can be achieved by encouraging discussions, sharing ideas and knowledge, but also reflecting on the development of knowledge and skills and how to apply them (Dochy, 2018; Veenker et al., 2017). The tasks set out by the educational professional create opportunities for both verbal and non-verbal interactions and encourage listening and working together regardless of individual strengths and weaknesses and work best in a face-to-face learning environment (Grenier & Yeaton, 2019). Combined with continuous feed-forward on team interaction will support and enhance the quality of the interactions (Dochy, 2018; Veenker et al., 2017)

Real life learning

Through real life situations, opportunities for interaction and communication are created that help the students with AD understand social rules, relationships, and the different types of communication that people use. Through the assigned group roles, it becomes easier to share ideas and strategies for solving problems together **(Grenier & Yeaton, 2019)**.

Group processing (reflection)

Listening, dialogue and reflection are an important part of collaborative learning (Dochy, 2018). Through these aspects, the students learn to respect their differences as they work together (Grenier & Yeaton, 2019) and though evaluation learn how well the group has functioned and where to improve (Grenier & Yeaton, 2019). This type of peer-learning benefits collaborative learning as it promotes healthy relationships while the individual learning needs of the students are addresses (Grenier & Yeaton, 2019; Stackhouse, 2018)

Play

Students with Autism Spectrum Disorder benefit from elements of 'play' within their curriculum as it helps improve social skills and independence as well as showing a boost in academic performance and student well-being (Broussard, 2011; Lei et al., 2018)**. An added effect, according to Lei and colleagues (2018) is that an implementation also helps with the transition to higher education, something students with Autism Spectrum Disorder also struggle with** (T. Bakker et al., 2019)

'Play' creates a positive environment for learners to develop skills in, such as communication, thinking, problem solving and other social skills (Bennie, 2020; Madriaga, 2010) For students with Autism Spectrum Disorder, role-play is an interesting form of play as it can draw from their inherent creativity while giving them the freedom to express themselves and their ideas, thus creating an increase in engagement and self-confidence (Natekar, 2019; Sherrin, 2015). Roleplay uses storytelling to act out actions and reactions to improve social skills and creativity (Karwowski & Soszynski, 2008; Waskul & Lust, 2004). In role-play, sometimes also referred to as cooperative play, players work together to achieve common goals through communication. Clear visual instructions and rules will help the learners with ASD understand expectations (Karwowski & Soszynski, 2008; Raising Childeren, n.d.).

Table Top Role Playing games (TTRPGs) are grounded in roleplay, action-adventure and fantasy (Mearls & Crawford, 2014). These are elements, people with ASD have indicated as their preference when It comes to games (Jansen, 2021c; Mazurek et al., 2015). A Table Top Role Playing Game (TTRPG), is an interactive game in which a small group of people create a fictional story together using pencils, paper, dice and conversation, often set in a fantasy world in which the players go on an adventure, explore and solve conflicts (Hawkes-Robinson, 2008; Kilmer & Kilmer, 2019; Mearls & Crawford, 2014). The players create a fictional character that they will role-play throughout the game. Through role-play, they determine the actions of their character, based on their personalities and background (Fein, 2015; Kato et al., 2012). The actions in the game will either succeed or fail according to a formal system of rules and guidelines for play. This type of game is played over a longer period of time (Hawkes-Robinson, 2008; Katō, 2019; Kilmer & Kilmer, 2019; Zagal & Deterding, 2018).

TTRPG's have become increasingly popular in aiding learners with Autism Spectrum Disorder during therapy and specialized training. They have been proven to aid in the development of social skills of players as they are focused on player communication and cooperation (D. A. García-Villamisar & Dattilo, 2010; Gutierrez, 2017; Hawkes-Robinson, 2008; Katō, 2019; Kato et al., 2012; Rosselet & Stauffer, 2013). Besides benefiting the development of social skills, TTRPG's have also proven to improve student well-being, high quality relationships, self-esteem, creativity (Chung, 2012) and academic performance (D. García-Villamisar & Hughes, 2007; Katō, 2019) However, not much can be found on the implementation within education.

When asked about table-top role playing games, people with autism spectrum disorder stated (Jansen, 2021c):

> *"TTRPG's gives me a sort of "playground" to practice social interaction without having to worry about real life stakes."*

> *"I really like being able to become somebody else in a table top role playing game and live in another world"*

> *"Roleplay is difficult and doesn't come naturally, but it's probably the most rewarding part of the game to me. I like a good story, and at the end of the day a story is usually about characters and how they interact."*

Principles of role-play

When role-play gets implemented into education, it allows the educational professional to tailor the learning moments to the needs of the learner **(Sherrin, 2015)**. By presenting the students with social situations they could encounter in real life, such as conflict, compromise, identity, choice and the consequences of their choices, the learned social skills can be easier transferred to real-life skills (Jackson & Back, 2011; Sherrin, 2015)

The elements important in roleplay to enhance the development of social skills; an engaging topic, learning goals, urgency, and an environment that allows for continuous feedback and development. With this setup, students are allowed to safely deepen their skills, increase their self-awareness and continue learning during and after play (Jackson & Back, 2011).

Conceptual framework

An intervention will be developed in the form of a tabletop role-playing game that uses collaborative learning to increase the impact of strength based learning to aid the development of social skills of students with Autism Spectrum Disorder in higher education. The principles found in the theoretical framework have been used to construct a conceptual framework for the development of the intervention.

The conceptual framework applies to the individual student that will use the TTRPG to increase their social skills while being supported by the educational professional in this framework. The desired situation for the student is portrayed in figure 1.

Throughout the intervention, the educational professional should coach the the students with a strength-based approach to enhance the development of social skills (Grandin, 2007; Pedaste et al., 2015).
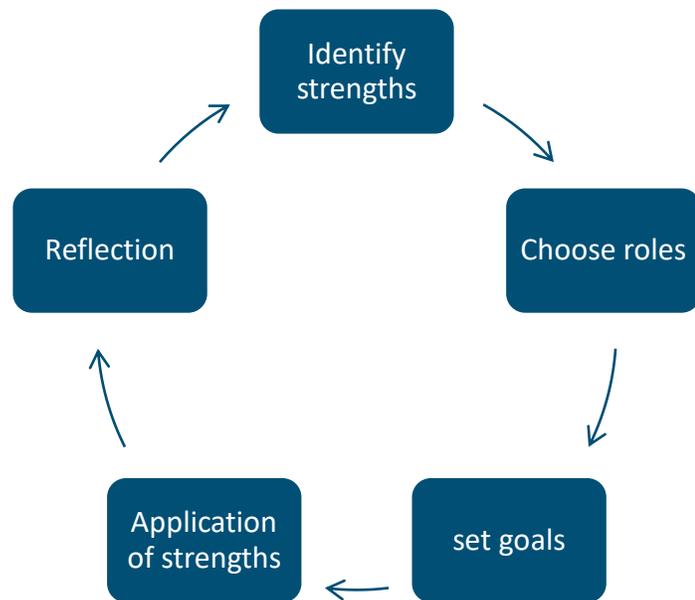

Figure 1 conceptual framework for the intervention

Design requirements

Based on the theoretical framework and conceptual framework, the design requirements and principles can be created. The design requirements will be used to focus on the goal of the intervention, whereas the design principles will explain how this is being done (table 1).

Goal: The TTRPG aims to help students with Autism Spectrum Disorder develop their social skills through stimulating the identification of one's own strengths, choosing roles within a group setting, setting goals, applying their strengths in real life situations and reflecting upon their actions.
Intervention name: Sisters of Nature

Table 1 Design Requirements and Principles for the Sisters of Nature

Conceptual Framework	Design Principles	Design Requirements
The student should be able to **identify their strengths**	To help students identify their strengths, the intervention should use visual aids and discussion to help them find their strengths (Teti et al., 2016) as most young adults with Autism Spectrum Disorder can find strength identification difficult (Cosden et al., 2006) To support students in the identification of their strengths, it is important to help foster a growth mindset that focusses on positive development, to help students to believe in their abilities, embrace challenges and learn to see their own value (K. M. Bowers & Lopez, 2010; Dweck, 2017; Zacarian et al., 2017).	The TTRPG should facilitate both the student and the educational professional with the tools to **identify the strengths of each individual student**
The student should be able to **understand differences** within a group by picking a **role** in a team	By creating clear roles within a group, individual accountability gets established (Zacarian et al., 2017). With clear roles, and an identification of strengths, students could, over time, start to analyze how strengths of others could manage their weaknesses **(Lopez & Louis, 2009a).**	The TTRPG should facilitate the students with space to create **strength collaborations.**
The student should set **goals** together with the other members of the group	Implementing group goals and rules increase the effects of collaborative learning, individual accountability and help build team commitment (Dochy, 2018; González & Merino, 2016; Jackson & Back, 2011)	The TTRPG should facilitate the setting of **goals**, either individual goals or team goals, have clear rules and give the students space to **discuss** and achieve their goals.
The student should be given an opportunity to **apply their strengths** in real life situations	Learned social Skills are more easily transferred to rea life when the students get presented with real life situations they can safely practice with, such as conflict, compromise, identity, choice and the consequences of their choices (Jackson & Back, 2011; Sherrin, 2015)	The TTRPG should present the students with **real life situations** and opportunities, while allowing the students **room for choice,** to decide how to demonstrate their strengths (Lopez & Louis, 2009a) and increase their self-awareness (Dyson & Casey, 2012)d.

	To create a personalized learning experience, it is important to allow room for choice as to how to demonstrate individual strengths (Lopez & Louis, 2009a). By presenting the students with social situations they could encounter in real life, Combined with continuous feed-forward on team interaction will support and enhance the quality of the interactions (Dochy, 2018; Veenker et al., 2017)	The TTRPG should present the educational professional moments to provide the students with **feed-forward** when strengths are applied well.
The students should be given an opportunity to **reflect** upon their actions and **evaluate** future possibilities	Through reflection in application of their strengths, students will start to understand how to use their strengths to their benefits in both academic challenges and social situations (Lopez & Louis, 2009a; Louis, 2008) and possibly come up with different methods for future situations (Department of Education and Early Childhood Development, 2012; Dochy, 2018; Jackson & Back, 2011; Online et al., 2004)	The TTRPG should give the educational **professional insight into the talents** of each individual student so they can help them **reflect** on how to use these strengths in and outside of the direct learning environment (K. M. Bowers & Lopez, 2010; Carey, 2004; Lopez & Louis, 2009a; Reinert Center for Transformative Teaching and Learning, 2016).

Solution context

The TTRPG will not be designed as part of a curriculum but as a stand-alone product that can be implemented in higher education, in group coaching sessions or as an extra-curricular activity. To further define the design, it is important to map out the implementation of the TTRPG. To gain insight in the goals and content of the lesson plan, the curricular spiderweb by van den Akker (Akker, 2003; Thijs & van den Akker, 2009) has been applied.

	The learning environment	The TTRPG
Vision	"Through playful learning, everyone can discover their strengths and learn how to harness their talents." (Jansen, 2020)	The TTRPG will combine role-play with a strengths-based approach and collaborative learning to enhance student learning
Learning Goals	*Learning goal 1:* The student manages their self-development; displays self-knowledge, such as awareness of own talents, recognizing learning opportunities and can use their talents to support their development. *Learning goal 2:* The student is capable of formulating learning needs and goals, takes responsibility for their actions and can reflect on their actions to benefit future learning. *Learning goal 3:* The student collaborates within a diverse, multidisciplinary, multicultural and/or international environment, whereby the student manages to communicate their thoughts and ideas clearly to other students and is capable of listening and reflecting on thoughts and ideas of others.	It is important for students to develop their social skills. The TTRPG will provide opportunities and challenges for students to apply their strengths and give room for reflection.
Learning Content	Through the TTRPG, the students will learn to identify their own strengths to benefit their learning process. They learn to engage in dialogue with others, work and communicate together to achieve common goals.	The TTRPG should focus on role-play as it allows students with ASD the freedom to express themselves and their ideas and helps increase their self-confidence, engagement and well-being (Natekar, 2019; Sherrin, 2015).
Learning activities	Strength based learning has been proven to yield the best results for learners with ASD as it creates deeper levels of engagement (Grandin, 2007) and engagement supports learning (Grandin, 2007; Veenker et al., 2017).	The intervention should present the students with social situations they could encounter in real life, such as conflict, compromise, personal identity, choices and consequences of their choices (Jackson & Back, 2011; Sherrin, 2015)

		The intervention will create opportunities for student to use their talents, such as creative problem solving (Mearls & Crawford, 2014) to support their own learning and development.
Role of the educational professional	The educational professional supports the students and leads the sessions, ensuring positive interaction and feed-forward. The educational professionals that will use the intervention will be teachers and coaches who work in higher education as academic counsellors in year 1 or as counsellors in student support centers.	The TTRPG will provide the educational professional with a clear manual and tools to guide the students in their learning and development process
Materials and resources	The Intervention needs a clear structure to create an environment in which learning is safe and fun and benefit the learning of the students (Decuyper et al., 2010; Dochy, 2018; Mazurek et al., 2015).	The TTRPG will make use of physical items (paper, dice) that are defined by visuals to increase clarity (maps, cards) The coach will use role-play and storytelling and will receive an easy to use book, that includes a clear structure, rules and goals.
Grouping	Students will learn in a collaborative setting in groups of 3-5 and 1 coach. The students in their group all have learning difficulties, not all of them nescesarily have ASD. Other learning difficulties might also benefit from this intervention. The group will be supported by a coach who coaches using a strength based approach.	The groups that will be made will stay together for the duration of the entire first year to create a safe learning environment which has been built on mutual trust, honesty, clear goals, continuous feed-forward and reflection through dialogue. (Decuyper et al., 2010; Dochy, 2018) According to Kato (2019) and several other researchers, it takes time to develop social skills (Rosselet & Stauffer, 2013) and with the grouping being the same, the development of these skills is enhanced.
Learning location	The students will come together in a physical location to enhance the development of both verbal and non verbal skills (Grenier & Yeaton, 2019).	The Intervention needs a clear structure to create an environment in which learning is safe and fun and benefit the learning of the students (Decuyper et al., 2010; Dochy, 2018; Mazurek et al., 2015).
Time	Students will gather weekly or bi-weekly in a physical location for approximately 2-3 hours to engage in play.	The intervention should be designed to last for a while, as developing

| | | social skills in students with ASD takes time (Katō, 2019).

The intervention should be implemented as soon as new students start their study in higher education as the transition is difficult for students and their problems arise as soon as block 1 (T. C. Bakker et al., 2020) |
|---|---|---|
| **Assessment** | **Assessment of the skills development is done through self-reflection** | At the end of each session, the educational professional needs time to help the students reflect and evaluate the session to enhance the learning moment. |

Solution Design: The Sisters of Nature

Support the development of The Sisters of Nature on Kickstart [link]

Target audience

The first two years in higher education are experienced as difficult for students with ASD. Study progression declines as soon as the first semester, resulting in a continuous delay in their studies and a decrease of student well-being (T. C. Bakker et al., 2020; Comer & Comer, 2019; Shattuck et al., 2012)**. This shows a need for an intervention to be implemented as soon as students with ASD enter higher education, therefore the target audience for this intervention are first-year students. It has been proven that effectively designed interventions during the first-year of a study program can positively impact student engagement and well as academic performance (Bers, 2006; Kahu, 2013; Starke et al., 2001; Strayhorn, 2009) .**

Through research and interviews it was found that higher education students with ASD struggle with their social skills when it comes to working together, communication, conversing, starting conversations and understanding of (often complex) social situations, but also struggle with the transition from previous education forms into higher education (T. Bakker et al., 2019; Cai & Richdale, 2016; Jansen, 2021a, 2021b; Nederlandse Vereniging voor Autisme, n.d.; Valérie Van Hees , Tinneke Moyson, Ph.D. & Herbert Roeyers, 2018).

The intervention will primarily be designed to support students with ASD to develop their social skills, however, students with other learning difficulties might also benefit from this intervention.

Object of play

Students with Autism Spectrum Disorder often struggle during their time in higher education during the transition period in year 1, mostly due to their problems with social skils (T. C. Bakker et al., 2020; Dijkhuis et al., 2017; McPartland et al., 2016; Van Heijst & Geurts, 2015)**. Studies show that both higher education and the work field require young professionals to be adept at skills such as; communication & collaboration, critical thinking & problem solving, planning & organisation, flexibility, and emotional intelligence (Ackerman, 2020; Blair & Cybele Raver, 2015; Cai & Richdale, 2016; Jansen, 2020; Luksha et al., 2018; World Economic Forum, 2020).**

Collaborative learning opens opportunities for interaction when these students are being supported by their environment. A supportive environment helps the student overcome learning challenges by being accepted for their contributions within the group (Grenier & Yeaton, 2019). Collaborative learning, like strength-based learning focusses on several principles to enhance learning.

The students will be playing a fantasy based role-playing game in which themes such as roleplay, exploration and action are combined to fit the students needs and interests (Katō, 2019; Mazurek et al., 2015). The TTRPG has been designed based on extensive research into Autism Spectrum Disorder, their talents and challenges and uses strength-based learning to improve the communication and collaboration skills of your players.

Game summary

The sisters of Nature is a collaborative role-playing game in which the players are adventurers hired to help a town solve a problem. They have to work together as a team to find out what happened in the town, which ritual of the sisters they should perform and how to do it. They do so by interviewing people, learning about past events and discovering the truth about the rituals before making their final decision. Which Sister of Nature will be appeased during this year's harvest festival and which one will end up cursed?

The role of the educational professional

The educational professional dives into the role of game master (GM) and will be responsible for guiding the play and supporting the students in their development. As a Game Master you will be leading and narrating the story told in this adventure. You will guide the actions of the players by helping them with dice rolls, encouraging role-play aspects, storytelling and role-playing yourself.

Learning and development focus

The Sisters of Nature has been designed to help learners with Autism Spectrum Disorder, develop their social skills in terms of communication & collaboration. In this adventure the players learn to work together to solve conflicts between people, to find creative solutions to problems they encounter, and to draw on their strengths instead of focussing on weaknesses. Each chapter has been designed to help the game master coach in a strength-based manner and according to proven didactical methods to support the development of talents and overcoming challenges.

S.A.F.E method

S.A.F.E. Stands for *Stimulate, Address, Feedback and Empower* and are referenced throughout the adventure to quickly understand how to support and stimulate the learning and development of the social skills of your players. Each chapter in the adventure will have tips on how to implement the S.A.F.E. method as a game master. This method is grounded in strength-based and collaborative learning theories (Dochy, 2018; Lopez & Louis, 2009b; Reinert Center for Transformative Teaching and Learning, 2016; Zacarian et al., 2017)

Stimulate: The GM stimulates and supports interaction within the group to enhance the quality of the interaction. This can be done through NPC's asking questions to the players or by the GM asking open-ended, learner focussed questions to support learning.

Address: When conflicts occur, either because of the group or outside of the group, the GM addresses these conflicts and coaches the players towards a solution by drawing on their strengths, this way the players will get equipped with conflict management skills for the future.

Feedback: Throughout each chapter, the GM provides the players with feedback, giving them insights into their way of working, to help them identify areas of improvement and to promote desirable behaviour.

Empower: The GM gives players the opportunity to experiment with different solutions to problems instead of providing solutions. Through coaching you will stimulate and encourage the players to coach each other, and give recognition and praise for the work done providing positive encouragement.

In each chapter in this adventure, tips will be provided for each aspect of S.A.F.E, to enhance the coaching of the GM by providing you with tips and examples to get the best out of your team.

The players

This adventure has been designed for students with Autism Spectrum Disorder who struggle with communication & collaboration skills but can be played by anyone looking to improve these skills. For the adventure to be most effective, a group should consist of 3-5 players. Their playable character will be a lvl 1 character, either made themselves via a source such as dndbeyond.com or by choosing one of the pre-made lvl 1 characters.

Duration

To enhance the impact of learning, the adventure should be played on a weekly or bi-weekly basis, taking up a total of 6-8 sessions to finish. The layout of the adventure follows the S.A.F.E method which is designed to help gamemasters with effective support of the player group.

Materials

Box containing the following items
Playing cards

- Playing cards (Appendix B)
  - Talent (ability) cards
    - Talent cards are used to help make a character
    - If a player wants to use their talent, roll 2d20's and pick the highest.
  - Item cards
    - Item cards are used to have a visual representations of the item a character carries
  - Clue cards
    - These cards are earned by players upon successful play. They are a visual reminder of the clue's found by the players
  - NPC cards
    - These cards can be used by the game master to draw focus to the NPC the players talk too and are little cheat sheets for the game master of how to role-play a character
- Maps (boards) of the regions being played on
- Set of Dice
  - 1d4 + 1d8 for attacks
  - 2d20 for talent checks
- Character sheet
- A manual for the game master
- A rule sheet with an explanation of the rules and structure of the game
- S.A.F.E. Method

How to play

This is a semi-linear intrigue mystery style adventure. The players are encouraged to interview the NPC's, search the town and the surrounding areas for clues and magical items.

As this is an adventure that focusses on learning how to work together and communicate as a team, the game master is encouraged to coach the players to asking the right questions and to pause the game whenever necessary.
For example, when players seem to be stuck in a conversation with an NPC or not ask the right questions, as a game master you can pause the game and ask what the players have found out up until now, you can ask them for a summary and ask them what information they might be missing and how they think they can find that information before resuming the roleplay.

The most important part of this adventure is to have fun in a safe learning environment, in which making mistakes is okay and which will never cost the players their in-game life or rewards.

A lesson plan has been designed for the TTRPG and can be found in appendix A.

Learning Goals

Every chapter in the Sisters of Nature adventure provides opportunity for role-play, strengthening your players collaboration and communication skills. Each chapter gets highlighted by the use of icons to shows which learning goal(s) drive them. The goals of the Sisters of Nature are listed below.

Setting goals
The players take a moment to set goals and expectations together as a team as it helps build commitment in the team.

Communication
Communication is used to express thoughts, experiences, and assumptions in a dialogue. Through role-play in game, the players get the freedom to express themselves and their ideas, creating an increase in engagement and self-confidence.

Collaboration
Collaboration is a joint effort of multiple individuals to accomplish a task or set out goal. This happens through both verbal and non-verbal communication. The goal of this encounter is to create a communication loop in which the players check for assumptions, insights, and knowledge that they have gathered before making a decision.

Creative problem solving
As planning and organization are needed to achieve a successful outcome, but are often difficult skills to develop, the players use creative problem solving to think and plan out how to approach situations or solve problems.

Reflection
Self-reflection is a process in which the player looks back at previous actions that were not 100% successful or have room for improvement and tries to reason how to improve their actions for the future through evaluation, as self-reflection enhances their learning process.

Types of Encounters
The adventure is set up with different encounters; role-play, exploration/discovery and combat.

Role play: Through role-play, the players get the chance to communicate amongst themselves or with others. This aspect enhances communication and collaboration and aids in setting goals.

Exploration: Through exploring area's the players can use creative problem solving in exploring situations and discovering new areas and in doing so find out how to complete the adventure

Combat: Combat helps players collaborate together and gives the possibility to plan ahead through communication. It will also help the players see that each person has their strengths and that together you can achieve more than when you work alone.

Appendices

Appendix A : Lesson Plan for the use of the Sisters of Nature

Lessonplan: Session 1

Task	Goal(s)	Design Requirement	Teacher Task	Student Task	Explanation
Introduction	**Explaining the rules & Structure**	The TTRPG should facilitate the setting of **goals**, either individual goals or team goals, have clear rules and give the students space to **discuss** and achieve their goals.	**The teacher explains the game (role play adventure), the rules of the game and the structure in which is played to create clarity for the students**	**The students listen to the explanation and can ask questions if they have them**	**The overall game will be explained, including the rules, how to use the dice etc (see how to play). And then the task of creating characters get introduced.**
Design a character	**Identifying strengths (reflection)**	The TTRPG should facilitate both the student and the educational professional with the tools to **identify the strengths of each individual student.**	**The teacher explains the task to the students and probed the students with student focused questions to help them identify their strengths**	**The students receive a deck of cards with visuals and descriptions of the strengths to define their own strengths. They can choose 3-5 strengths for their characters.**	**The students will be designing their own character. Start with simple things such as a race and a class (visuals) before talking about their strengths. The chosen strengths will come back later in the game.**
Introduction	**Active listening**	The TTRPG should present the students with **real life situations** and opportunities, while allowing the students **room for choice,** to decide how to demonstrate their strengths (Lopez & Louis, 2009a) and increase their self-awareness (Dyson & Casey, 2012)d.	**The teacher will set the scene for the role-play, explaining the students the world, the situation they are in and will give them time to talk to each other for the first time**	**The students are listening until probed with a question from the teacher, then they answer**	**During the introduction, the students will be listening to the story starting. The teacher will end with the question for students to introduce themselves to each other.**

Discuss & Choose Roles	**Communication & collaboration**	The TTRPG should facilitate the students with space to create **strength collaborations.**	**Guide the discussion of what the students have chosen as their strengths for their characters. Try to also guide students towards comparing their strengths. Make notes of what the students have chosen as their strengths to use this further on in the game**	**Students describe their character and the strengths that they possess.**	**The students are describing the strengths to identify the strengths of each other. Encourage the students to create notes of this because these strengths will come back in the game.**
Role-play	**Active listening & Reflection**	The TTRPG should present the students with **real life situations** and opportunities, while allowing the students **room for choice,** to decide how to demonstrate their strengths (Lopez & Louis, 2009a) and increase their self-awareness (Dyson & Casey, 2012)d.	**The teacher will continue telling the story to the students (setting the scene) always allowing the students space to comment, ask questions or talk to each other.** **The teacher will play as the NPC to incite communication**	**The students are listening to the story unfold or they can take moments to have dialogue.**	**During the Role-play, the students will be listening to the story starting. The teacher will end with an introduction of the first NPC who will end her introduction with questions to probe player communication.**
Setting goals	**Communication & Collaboration**	The TTRPG should facilitate the setting of **goals**, either individual goals or team goals, have clear rules and give the students space to **discuss** and achieve their goals.	**The teacher has set up the scene and will now support the students in their dialogue**	**The students can discuss amongst themselves what they would like to do.**	**In this moment the students will discuss their goals, decide on tasks and how to approach them. The teacher will guide this process by using the S.A.F.E. method.**
Application of strengths	**Active listening, Communication & Collaboration**	The TTRPG should present the students with **real life situations** and opportunities, while allowing the students **room for choice,** to decide how to demonstrate their strengths (Lopez & Louis, 2009a) and increase their self-awareness (Dyson & Casey, 2012).	**Based on the decisions made by the students, the teacher will continue telling the story to the students always allowing the students space to apply their strengths in situations in the game, but also to communicate and**	**The students are listening to the story unfold and can take moments to have dialogue.**	**During the Role-play, the students will be listening to the story. They will meet characters in the game they can talk to or tasks to solve. The teacher plays the other characters in the game to**

| Task	Goal(s)	Design Requirement	Teacher Task	Student Task	Explanation
		The TTRPG should facilitate the students with space to create **strength collaborations.**	collaborate amongst each other or with NPC's played by the teacher.		incite interaction and creative problem solving.
Application of strengths	**Communication, collaboration, and Reflection**	The TTRPG should present the educational professional moments to provide the students with **feed-forward** when strengths are applied well.	**Throughout the Role-play the teacher can apply the S.A.F.E. method to give feedforward to the students, allowing them to understand their progress**	**The students will receive positive feed forward, increasing engagement and the impact of learning**	**The S.A.F.E method is applied to each part of role-play in the manual the teachers receive. Allowing for continuous feed-forward to support the learning and development of the student**
Reflection	**Communication, collaboration, and reflection**	The TTRPG should give the educational **professional insight into the talents** of each individual student so they can help them **reflect** on how to use these strengths in and outside of the direct learning environment (K. M. Bowers & Lopez, 2010; Carey, 2004; Lopez & Louis, 2009a; Reinert Center for Transformative Teaching and Learning, 2016).	**The teacher asks questions that lead to reflection, focused on how they used their strengths and how their strengths helped them get through situations.** **The teacher also looks for the strength collaborations and how the students worked together from their individual strengths to see if this could get strengthened in the next session.**	**The students reflect on their actions and create learnings for the future. The students can make notes for the next session.**	**At the end of the session there is time left for an evaluation of the session. The teacher will guide the students into thinking about how they handled certain moments and what they learned from it for future sessions.**

Lessonplan: Session 2 and following

Task	Goal(s)	Design Requirement	Teacher Task	Student Task	Explanation
Introduction	**Communication, Collaboration and Reflection**	The TTRPG should facilitate the setting of **goals**, either individual goals or team goals, have clear rules and give the students space to **discuss** and achieve their goals.	**The teacher asks the students to talk about what happened last time** **Tip: let students compare notes, ask them what they**	**Students will recap the previous session and discuss the goals for this session. When they reach consensus, the teacher can continue.**	**The teacher helps the student to recollect what happened previously and supports the decision-making process of which goal to aim for this time.**

|			enjoyed previous session and what they would like to try and do this session.		
Application of strengths	**Active listening, Communication & Collaboration**	The TTRPG should present the students with **real life situations** and opportunities, while allowing the students **room for choice,** to decide how to demonstrate their strengths (Lopez & Louis, 2009a) and increase their self-awareness (Dyson & Casey, 2012)d. The TTRPG should facilitate the students with space to create **strength collaborations.**	**Based on the decisions made by the students (goals picked), the teacher will continue telling the story to the students always allowing the students space to apply their strengths in situations in the game, but also to communicate and collaborate amongst each other or with NPC's played by the teacher.**	**The students are listening to the story unfold and can take moments to communicate and collaborate.**	**During the Role-play, the students will be listening to the story. They will meet characters in the game they can talk to or tasks to solve. The teacher plays the other characters in the game to incite interaction and creative problem solving.**
Application of strengths	**Communication, collaboration, and Reflection**	The TTRPG should present the educational professional moments to provide the students with **feed-forward** when strengths are applied well.	**Throughout the Role-play the teacher can apply the S.A.F.E. method to give feedforward to the students, allowing them to understand their progress**	**The students will receive positive feed forward, increasing engagement and the impact of learning**	**The S.A.F.E method is applied to each part of role-play in the manual the teachers receive. Allowing for continuous feed-forward to support the learning and development of the student**
Reflection	**Communication, collaboration, and reflection**	The TTRPG should give the educational professional **insight into the talents** of each individual student so they can help them **reflect** on how to use these strengths in and outside of the direct learning environment (K. M. Bowers & Lopez, 2010; Carey, 2004; Lopez & Louis, 2009a; Reinert Center for Transformative Teaching and Learning, 2016).	**The teacher asks questions that lead to reflection, focused on how they used their strengths and how their strengths helped them get through situations.** **The teacher also looks for the strength collaborations and how the students worked together from their individual strengths to see if this could get**	**The students reflect on their actions and create learnings for the future. The students can make notes for the next session.**	**At the end of the session there is time left for an evaluation of the session. The teacher will guide the students into thinking about how they handled certain moments and what they learned from it for future sessions.**

|			strengthened in the next session.		

Appendix B: Playing Cards

This is a sketch of what the playing cards would look like. Icons and colours will indicate the type of cards a player has. A visual will give body to the card and a brief description will indicate the purpose/use of the card.
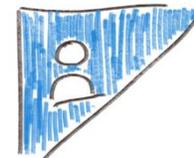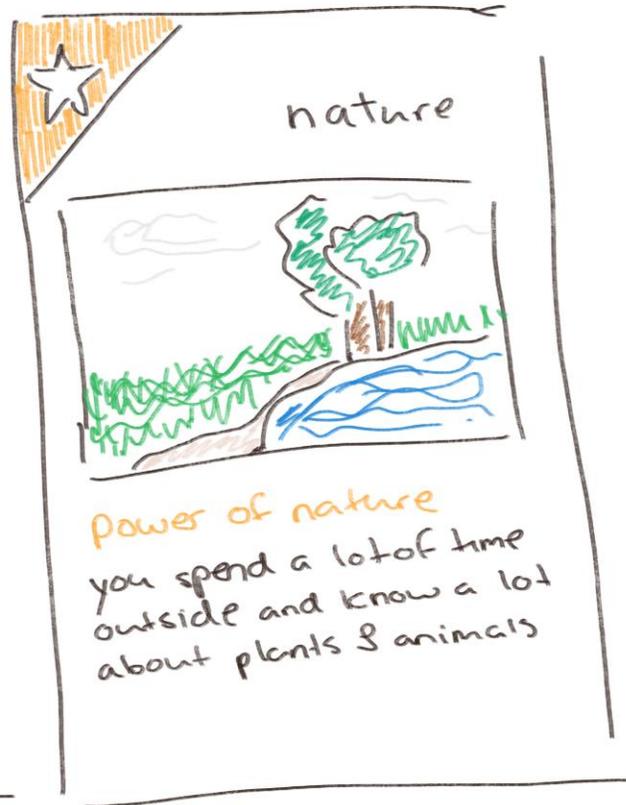
type

title

name of card

image

clear visual

type card name

description of use
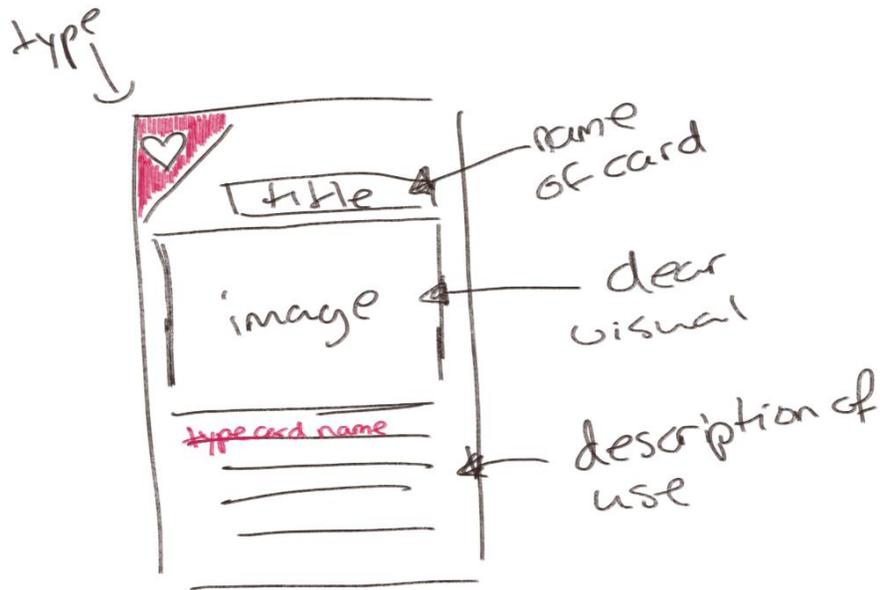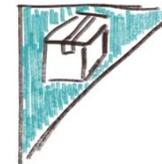
talent card
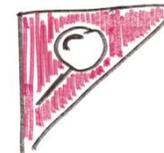
item card

clue card

npc card

Card types
- talent cards
- item cards
- clue cards
- npc cards

Talent card designs

Appendix C: The character sheet

The character sheet is used for players to have a visual representation of the character they are playing. The layout shows the base stats of the character in the top with a brief description of the character. The middle section shows the combat abilities for the character and the bottom part is the ability section in which players can slot their talent cards. This ensures personification of the character, as the player can add their own talents to the character that they chose.
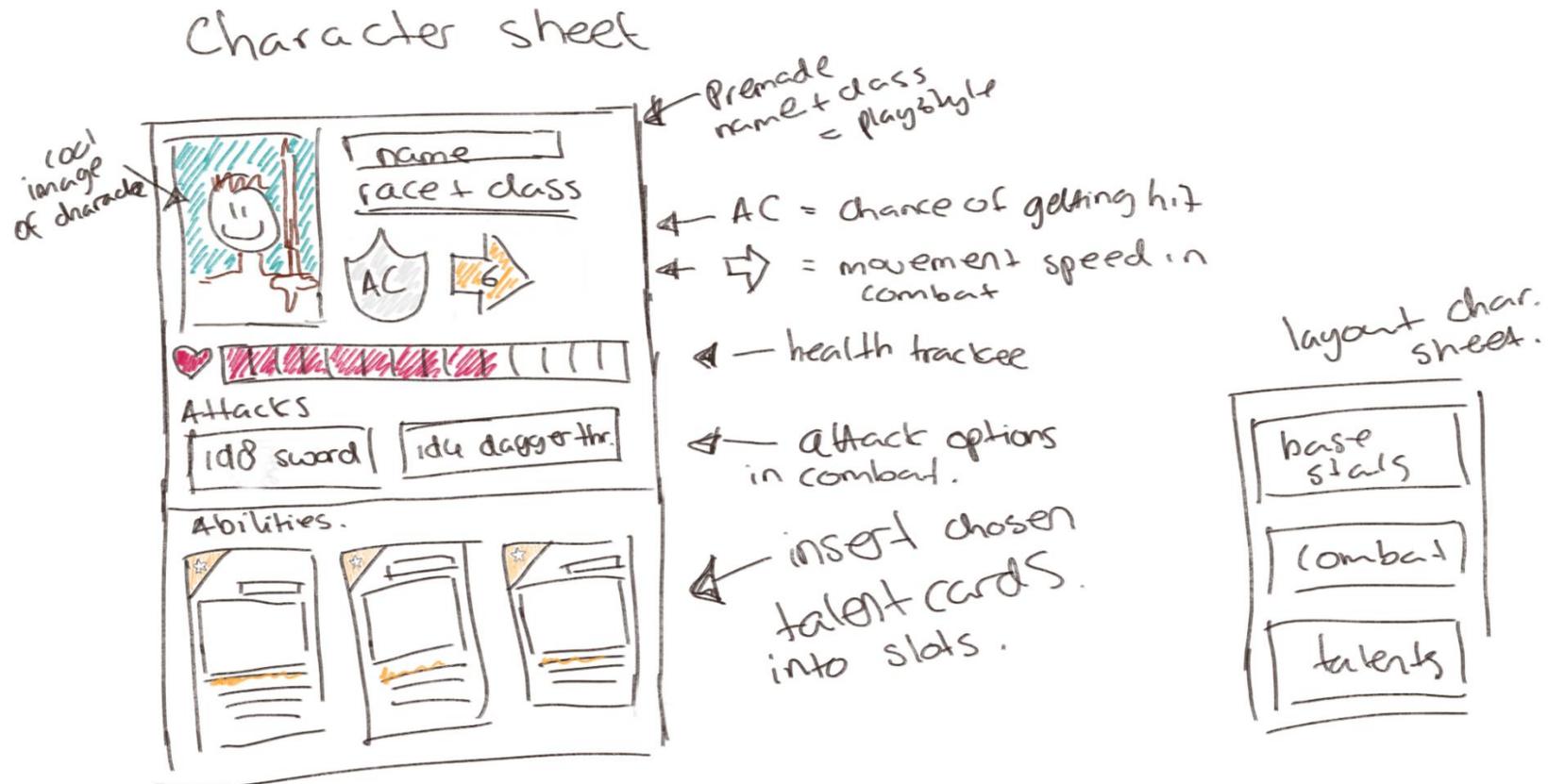
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