Blueprint 2: Nutrition And Physical Activity And Their Effect On Learning: MyFitnessPal,

Moki Physical Activity Tracker

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LDT 440

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June 25, 2019

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Introduction

Consider yourself a teacher in the 1970's. The recess bell rings and what do the kids do? Sprint outside to play on the monkey bars, swings, baseball, etc. A playground full of healthy and active children. Now it's lunch time. How are the kids eating? Probably a mixture of different meals, but mostly healthy portion sizes and unprocessed foods. Fast forward to the new millennium, the same recess bell rings and what do the kids of the 2000's do? Well, most of them are still outside playing on swings, basketball courts, and games like tag, however there is a growingly larger group who would rather sit around on devices such as iPads and chromebooks and don't much care for physical activity or cannot/will not participate, "why try? I already know I can't do it." At snack and lunch a quick snapshot will show that while some kids eat healthy, others eat unhealthy options or portion sizes that are much too large. The kids look different too. A portion of them is much larger. What has changed?

> "In the United States, the percentage of **children** and adolescents affected by **obesity** has more than tripled since the 1970s. Data from 2015-2016 show that nearly 1 in 5 **school** age **children** and young people (6 to 19 years) in the United States has **obesity**." (CDC, 2019)

This is compared to the 1970's, when only 1 in 20 school age children and young people in the United States were considered obese. (CDC, 2019)

> "With more of the adult population overweight or obese, the rates of childhood obesity have also risen to 33%. Just as research about obesity has indicated a negative effect on the body and vital organs, obesity seems to affect the ability to learn. Not only is it the responsibility of the family but also of the school" (Naticchioni, 2013)

As students move through grade levels they are growing more knowledgeable about themselves, their surroundings, and the thoughts of themselves and others. They are also achieving new levels of independence and responsibility. However, just because we

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are asking young learners to show initiative and make their own choices, doesn't mean they know how to make the appropriate ones.

> "Middle school students are often in control of what they put in their mouths, but many times they do not make or do not know how to make healthy choices. It is crucial to instill nutritional concepts in middle school children, who are typically ages of 12 to 14, because the way they eat now is likely to be the way they eat as adults." Ipatenco 2017

Therefore, it's imperative that the students make the connection between their dietary and fitness habits and the effect it has on their self esteem and academic performance as it can have ramifications well into adulthood and possibly the rest of their lives.

Purpose

The purpose of this document is to **address the problem of unhealthy eating and physical fitness habits and its effect on self esteem and academic achievement.** Because of the strong correlation between nutrition and fitness and their effects on cognitive development I will be proposing a combination of technologies to be implemented together focusing on nutrition and physical activity.

The document will also discuss how the two programs will be implemented and what it will look like in its targeted learning environment. The document will also discuss the affordances, opportunities, and challenges presented along with details regarding needed resources, existing or needed infrastructure, current or suggested policies, people and stakeholders, varying supports, desired learning and evaluations.

Teaching/Learning Environment Description

The environmental setting will be six middle school classrooms. One 6th, 7th and 8th grade classrooms in two district area schools. Each classroom will contain 15-30 students from the general education setting. The trial program will last one year with periodical team meetings to assess and discuss data and observations. Team will consist of administrators, IT specialists, and teachers implementing the program. The school calendar year is broken down into semesters (2).

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Audience

The target audience is middle school adolescents with ages ranging from 11-14. The audience is diverse in gender, ethnicity, socioeconomic status, and health.

Existing Technology

Existing technology includes class chromebook cart with a set of 30 devices, high speed wireless internet connection, and a current B.Y.O.T (bring your own technology, device) policy. Students also have their own G-Suite accounts (drive, gmail, docs, slides etc) for collaboration and organizational purposes. Learners also have access to a class blog (Kidsblog) to post reflective journals, as well as a digital media editor (WeVideo) to create multimedia projects/artifacts.

Teaching/Learning Problem

A. Description of the intended lesson/learning
B. Description of the teaching/learning problem or deficiency

A.) Description of the Intended Learning:

With the immediate feedback MyFitnessPal and Moki Physical Tracker provide students will seek to make the connection between dietary/nutritional and physical fitness habits to their self esteem and academic performance causing them to reflect and make necessary changes in their lifestyles resulting in positive self image, higher self esteem and better academic performance.

B.) Description of the Learning Problem/Deficiency

For a change to take place, a deep connection needs to be made. While middle school children have an idea of how their nutritional and fitness habits may affect their health

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and social standing, they don't not realize the effect it plays on their cognitive development and the role it may play in their future professional lives.

The problem we are aiming to solve is improving young students' academic achievement and self esteem. We hope to accomplish this by making the connection on how their nutritional and dietary choices along with their physical activity, exercise, and fitness habits affect their self esteem and academic performance.

Numerous studies have been done over the past few decades linking obesity to poor academic performance. While obesity is caused by many factors, two prevalent and main causes are:

1. Poor nutrition and dietary habits
2. Lack of physical fitness and poor exercise habits

Recent studies have demonstrated that nutrition affects students' thinking skills, behavior, and health, all factors that impact academic performance. (Wilder 2014)
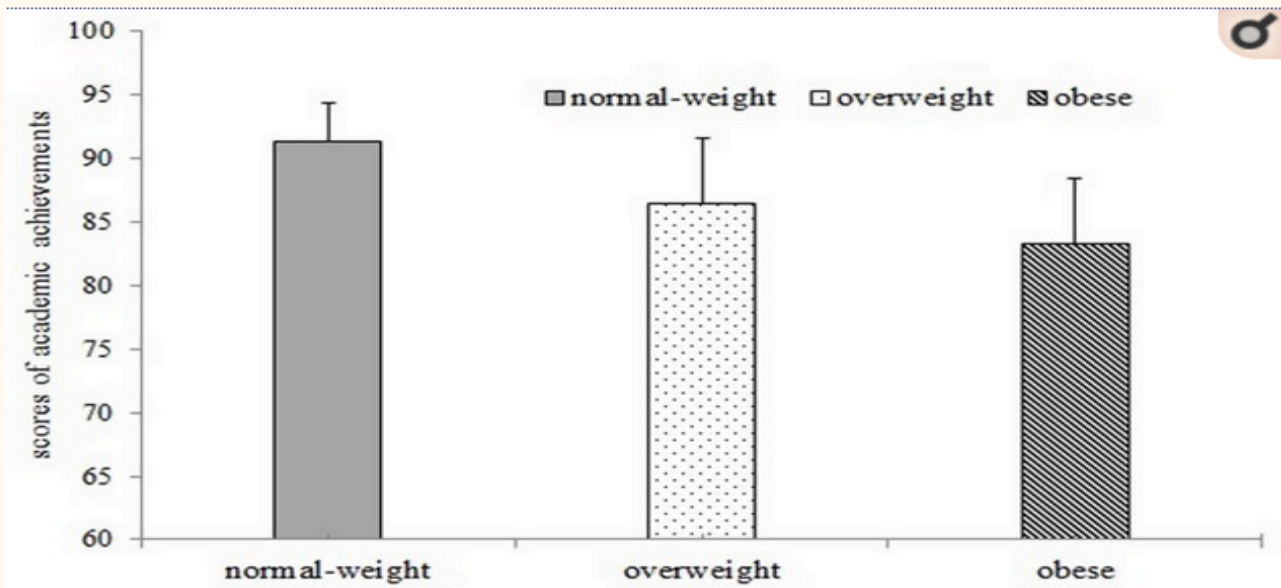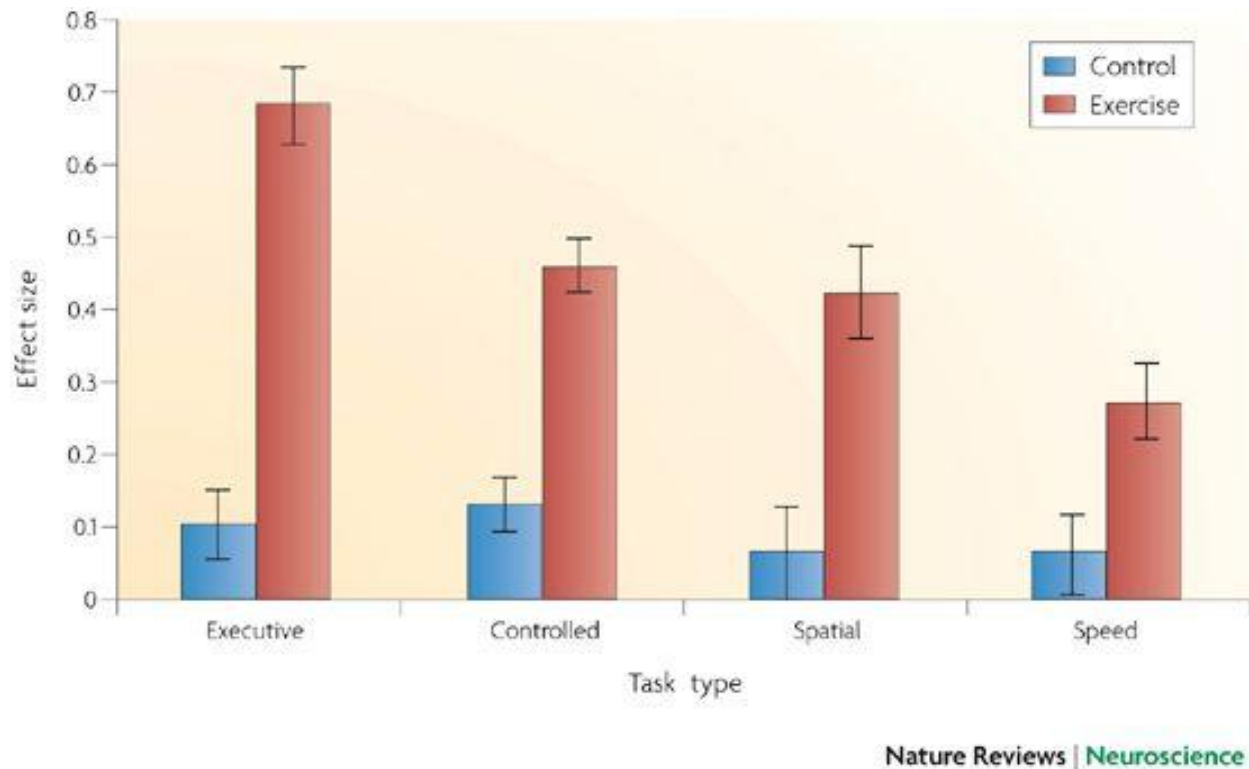

FIGURE 2

Normal-weight children had better academic performance than obese children.

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"Childhood obesity and overweight are associated with several metabolic and cardiovascular complications that have been well-documented (Daniels, 2006). Furthermore, childhood obesity is frequently associated with psychosocial issues (Krombholz, 2012); for example, overweight and obese children are more likely to have poor academic performance." (Wu, et al., 2017)

Nutrition also indirectly impacts school performance. Poor nutrition can leave students' susceptible to illness or lead to headaches and stomachaches, resulting in school absences (Brown, Beardslee, & Prothrow-Stith, 2008)
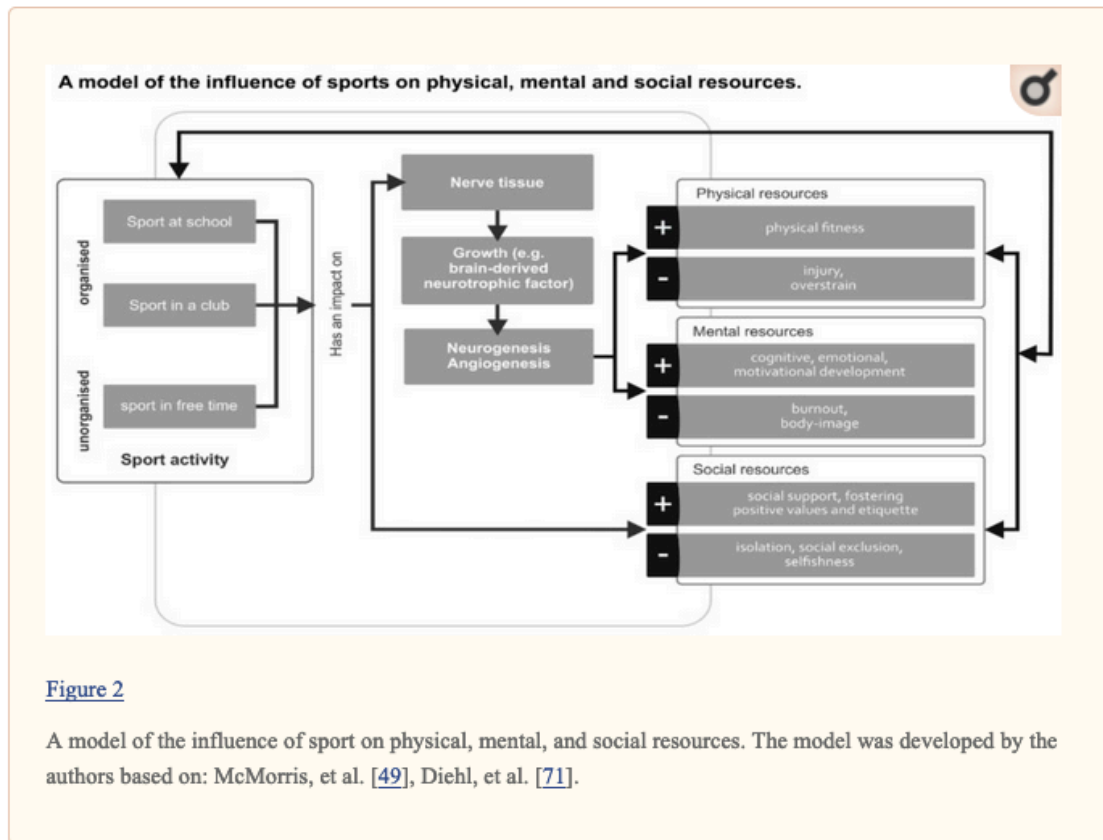
Consolmagno, et al. (2009) also noted that when young learners are involved with making decisions and responsible for their nutrition (such as creating a food diary and tracking food) they are more likely to connect with the lesson being learned and make changes.

In addition to nutrition, children are increasingly becoming less active. Lack of physical activity in childhood leads to increased risk of being overweight or obese in adulthood. According to the US Center for Disease Control and Prevention (CDC), physical activity has an impact on cognitive skills such as concentration and attention, and it also enhances classroom attitudes and behaviours, all of which are important components of improved academic performance. (CDC 2019)

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Nature Reviews | Neuroscience

Strath and Rowley (2018) & Brickwood et al, (2019) both have found that using a wearable physical tracker leads to more steps, more energy expenditure, and calories burned. Users that wear the device are also more likely to participate and stay participating. They also have pointed out since the exercise is quantified and data driven (ie goals, numbers and data) it is much easier to make the connection to their weight loss and self esteem.

Bidzan-Bluma, I., & Lipowska, M. (2018) indicate that children's engagement in physical activity may be associated with changes to certain brain structures, leading to an improvement in memory function (working memory in particular), as well as cognitive control.

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Figure 2

A model of the influence of sport on physical, mental, and social resources. The model was developed by the
authors based on: McMorris, et al. [49], Diehl, et al. [71].

Bidzan-Bluma, I., & Lipowska, M. (2018).

Selection of Technology to Integrate

Name of Program 1: MyFitness Pal (https://www.myfitnesspal.com/)

Brief Description: MyFitnessPal is a web-based and app accessible exercise and fitness social media applications. MyFitnessPal (MFP) is designed to help the user keep track of their daily food and beverage intake, calculating all their nutrients, calories, and vitamins for them, and the amount of calories burned from exercise. It has goal settings, charts, diaries, blogs, and is integratable with over 50 other apps and devices, including wearable devices. MyFitnessPal is a smartphone app and website that tracks diet and exercise to determine optimal caloric intake and nutrients for the users' goals and uses gamification elements to motivate users.

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Name of Program 2: Moki Physical Tracker (https://moki.technology/)

Brief Description: Moki is a pedometer wristband and software application that measures in-school physical activity and provides printable, user-friendly reports for schools and teachers. Moki has been designed from the ground up to be an intuitive, robust and reliable way to measure and motivate activity across an entire school. Moki can be used to create personalized challenges for individual children and/or classes or groups linked to positive rewards and achievements.

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Affordances

It is important to analyze the aforementioned technology before we consider implementing it so we can best assess its ability in relation to our reported learning deficiency. Here are listed affordances made possible by MyfitnessPal Tracker (nutrition) and Moki Physical Activity Tracker (fitness).

- **Cognitive**: The primary cognitive affordances offered by these tools are Discourse/Dialogue, Supportive, Learn By Doing, Self Regulated Learning, and Conceptual Change affordances.
    - ○ **Experiential Learning:** Along with teacher-guided discovery, learners will explore nutritional and dietary topics and create a live food journal to solve authentic problems that are surfacing in regards to their dietary habits.

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Learners will experiment with their goals regarding on how much they exercise and what types of foods they eat.

- **Discourse/Dialogue:** Learners will be sharing, collaborating with classmates through social media such as classroom blogs. They will also be required to reflect on what they have learned, collaborate with peers and other members of the community, and articulate and share their findings.

- **Supportive:** This program provides visual imagery through graphs and charts so learners can see trends, habits, and patterns and make adjustments where necessary.

- **Learn by Doing:** Moki Physical Tracker and MyFitnessPal both are personally relevant to these middle school students as they will learn about their fitness and nutritional habits through participation in actual authentic activities. Learners will also create a final summative artifact analyzing, summarizing, and reflecting on what they have learned.

- **Conceptual Change:** MyFitnessPal will invoke change upon the learners beliefs regarding how they view their nutritional/dietary habits. Learners will activate their prior knowledge and call upon their prior beliefs and perceptions and compare them to what they are learning in regards to their technological responsibilities.

- **Self-Regulated Learning:** Since the learning is authentic and affects their health and academic performance, expectations are that motivation to use MyFitnessPal will be high. Also, using the export features to upload to class blogs, social media will also be very engaging. The goal setting aspects of both MyFitnessPal and Moki Physical Tracker also promote self-regulated learning. Each program doesn't tell you how to exercise or eat, or when to exercise and eat, it is up to the learner to look at their data and make decisions.

- **Temporal:** Both the Moki and MyFitnessPal programs can be accessed at any time, any where there is an internet connection. Moki works without internet connection but requires one for uploading data via the readers/scanners.

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- **Synthesis:** MyFitnessPal has the ability to be combined with many other devices and features such as mobile phones and tablets via apps and websites including Moki Physical Tracker.
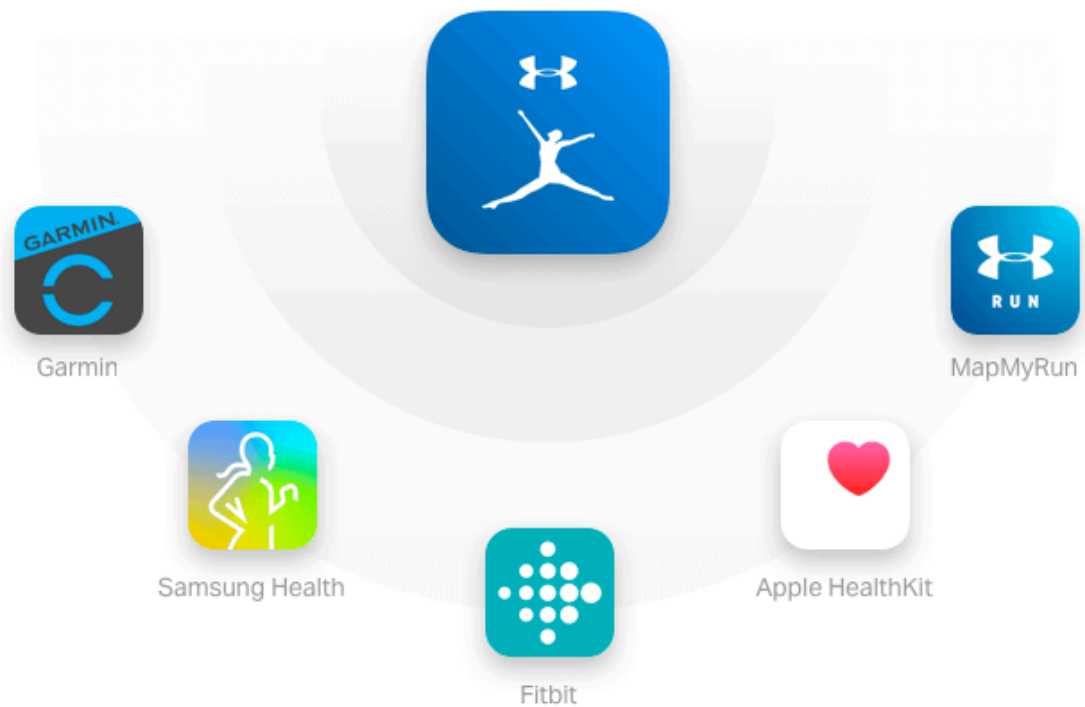
- **Technical:** The program is very easily used in school on the chromebooks, iPads and windows devices. Students with their own devices will not have issues as long as they download the apps that correspond with the programs. With the schools high speed wireless internet there are no issues outside of typical technology problems. Since both programs are app related, learners will have access outside of school on mobile devices and any other device. The created videos or products can be embedded into existing programs such as blogs, youtube, google drive/classroom, and websites.
- **Usability:** Very high. Specifically using MyFitnessPal will be very easy for this generation of learners as it has a QR reader to scan barcodes on the foods they eat. Manually entering information is also available. Moki Physical Tracker is very easy to use as it is put on the wrist like a watch and periodically scanned to

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analyze the data. Moki provides user-friendly reports for students schools and
teachers.

- **Aesthetics:** The overall design and look of the MyFitnessPal is very appealing
  and sleek. With the vivid charts, graphs, overlays, graphics it should have no
  problem holding the attention of the user and motivating them to learn their
  intended lessons. The Moki Physical Tracker, while simple in design is not bulky
  and also appealing to the viewer in both looks and comfort.

Demonstration

Schools play a unique role in physical activity opportunities.

> "Schools represent an advantageous opportunity to promote physical activity in
> children. Literally, they have a "captured audience." The ability to carve out time
> for physical activity whether it recesses, physical education or sports is unique to
> schools alone. Since nearly 50 million students attend school is there a better
> place to begin to engage children in daily physical activity?" (Bossenmeyer, 2012)

For optimal success. Students will first be given brief lessons on nutrition, how to use
MyFitnessPal. The second stage of implementation

Moki Physical Tracker & MyFitnessPal Tracker

Step 1: Pre-Survey	Children will complete a survey asking questions ranging from their self esteem, eating habits, physical fitness habits, academic performance, etc. These results will be anonymous and compared to the post survey results upon completion of the program.
Step 2: Launching MyFitnessPal	Students receive their MyFitnessPal Login information. They can use the web-based or app versions on the school devices or their own personal device. Students will have a brief tutorial on how to set goals, input calories and food into their food diaries.
Step 3:Launching Moki Physical Tracker	Students receive their Moki, and are trained in how to use it. At the beginning

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	of the day students tap their Moki bands against a data reader that is connected to your computer. Students will set their goals.
Step 4: Data Collection	Goals for MyFitnessPal and Moki can be adjusted during anytime if necessary. Students are gathering data and making connections.
Step 5: Collaboration	Students will interact with peers regarding their food diaries and fitness activities. Students are encouraged to praise fellow classmates and ask for support/advice/tips. Students are encouraged to create or join groups such as a walking club, cooking club etc to create more of a community of support.
Step 6: Weekly Blog Post	Students will post weekly summaries to their class blog site. In the weekly post they will summarize their weekly fitness and dietary goals. They will also discuss how the programs are motivating them or if they are not. Students will reflect on their mood and if they notice a change in their emotions, behavior, and academic performance. Students will comment on peers blogs and engage in discussions.
Step 7: Artifact Creation	Students will create an artifact using a presentation tool such as powerpoint, WeVideo, Youtube, Google Slides etc. to analyze their data, reflect on the process, and offer their insight on what they liked and didn't like. They will also summarize what they learned and how diet, fitness, and self esteem are connected to academic performance.
Step 8: Sharing of Artifacts	Students submit and share their reflections, findings, and created artifact.
Step 9: Post Survey	Children will complete the same survey as before (post survey) asking questions

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	ranging from their self esteem, eating habits, physical fitness habits, academic performance, etc. These results will be anonymous and compared to the pre survey results taken at the start of the program.
Step 10: Share Results/Analyze Data	The data will be shared with the students as well as used to have a discussion, debate and shared inquiry where peers can talk about what they liked and didn't like about the program. Members of the implementation team will gather all data from surveys and these discussions and meet and discuss the program's successes and failures.

Teachers and students are encouraged to create their own challenges and activities that go along with MyFitnessPal or Moki Physical Tracker. "Students could hypothesize about how they think different activities might affect the heart rate. They could also learn to track patterns in data by looking at the rich reporting provided by these devices. Students could analyze sleep patterns, heart rates; calories burned along with many other data sets provided by these devices." (Lynch 2017)

"Being physically active has physiological, psychological, social and cognitive benefits. For children, being active can enhance normal growth and development affecting the body and mind." Dr. White, Physical Activity for Middle School Students.

Rollout of Technology Integration, Via RIPPLES

The RIPPLES Model is a framework organizations can use to plan for the successful implementation of new tools and practices. I will be using this model for *Implementation Planning*, *Implementation Support*, *Implementation Evaluation*, and *Research*.

1. **Resources**

This is a combination of two technologies. MyFitnesspal is a free program. While a premium version is available for purchase, the free version offers everything students

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need to monitor their eating and exercising habits. The school district will not need to approve the use of funds to purchase memberships, but will need to approve the use of student email/ids for log in purposes. The second technology Moki Physical Tracker has fees. Each classroom will need a reader, and each student will need a fitness tracking band. Below is the cost for 6 classrooms.

Moki Physical Tracker Band (25.00, L/S) x 180 = $4,500

Moki Physical Tracker Reader (80.00, 1 per class) x 6 = $480

Total: $4,980

On a trial basis, this program will be implemented in the middle schools, grades 6, 7 and 8 at two specific schools for a one year basis to be evaluated at the end of the calendar year.

2. **Infrastructure**

Infrastructure is in place for implementation. Schools in the district have access to wireless high speed internet and class sets of devices (chromebooks) that are able to access the internet and this program. Classes that have ipads will also be able to access this program. Other options:

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- Option 1: share with a buddy class.
- Option 2: Pull extra chromebooks from class carts to create extra class sets.
- Option 3: CPU lab.

The school already has in place a B.Y.O.D program. Students can use their own tablets, laptops, and mobile phones to access the programs. The learners also have student G-suite accounts, including Google Drive which make for the easy sharing of resources to social media and other blog sites.

3. People

The stakeholders involved will be the school board, director of teaching and learning (6-8), administrators, teachers, parents, and students, members of the community such as physicians, physical trainers, and nutritionists. Decisions on expectations will come from the board and director of teaching and learning and passed down to administrators and faculty members. Faculty members can direct questions to administrators who can share them with the director of teaching and learning and the board.

4. Policies

Teachers are allowed to experiment and design and create their own lessons and projects with the program. However, the expectation is that the students will complete a diary or journal, pre and post survey, and engage in discussions with peers, teachers, and members of the community. The students will also complete a summative project (blog, multimedia video, presentation, etc.) reflecting, analyzing, and detailing their journey throughout the process.

5. Learning

Students will be learning the connection between exercise, nutrition, self esteem, and academic achievement while developing healthy eating and exercise habits. Learners will be asked to reflect on how these concepts and use of purposed technology specifically impacted their self esteem and academic performance. They will engage with topics such as exercise, nutrition, self esteem in combination with the audio and video features of the existing editing software (WeVideo) will allow learners to creatively

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showcase skills like justifying, interpreting, reflecting, analyzing, teaching, and other critical thinking skills through vlogs, podcasts, or instructive videos. Learners will reflect, but also engage with each other via class blog with discussion, debate, and shared inquiry.

6. Evaluation

The team will be assessing its effectiveness in the classroom from the perspective of the students and teachers. Teacher/student surveys, student reflective journals, and semester unit projects will all be used to evaluate the programs efficacy. Even though myfitnesspal is free, is there a better option based on results? Would it a paid version fare better? Has a better option emerged? With the Moki Physical Tracker are there clear and attributable results from the implementation of the technology? Was this data worth the excessive cost? How has the response been from users and has the transition had any problems or hiccups? These will all be considered moving forward.

7. Support

Teachers will receive a PD or trainings throughout the year to help learn how to effectively use the program. Teachers also have access to free online PD and digital tutorials. Teachers would also benefit from pedagogical support from the IT department or skilled and experienced users helping them design effective and targeted tasks/lessons. Having leadership from the Admin team to set guidelines and expectations will give the faculty a clear vision on what they should be working toward. Students would benefit from targeted lessons on how to use certain aspects of the software as well. Support from the IT department could handle troubleshooting, trainings, and any professional development needs.

Conclusion

Obese children are at risk for a slew of health problems as they get older if they don't change their habits. In addition to their health problems they also face physical, emotional, and cognitive risks as well. This will affect them in school, at home, in their community, and when they go to enter the workforce. If the connection between dietary,

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nutritional, and fitness habits is not made to self esteem and academic performance
these children could be in significant trouble moving forward.

> "above and beyond socioeconomic factors, diet quality is important to academic
> performance. This association is important to children's future educational
> attainment and herewith future income, socioeconomic status, and health. These
> findings support the broader implementation and investment in effective school
> nutrition programs that have the potential to improve student's diet quality,
> academic performance, and, over the long term, their health". (Florence, 2008)

> "Studies have variously found that obese students -- and especially girls -- tend to
> have lower test scores than their slimmer peers, are more likely to be held back a
> grade, and are less likely to go on to college." (Gardner, 2014)

Diet is something that schools and its students should focus on. Diet can affect
cognitive ability and behaviour in children and adolescents. Nutrient composition and
meal pattern can exert immediate or long-term, beneficial or adverse effects. Beneficial
effects mainly result from the correction of poor nutritional status. (Bellisle, F. 2004)

In Portugal, they are creating food diaries and working on calorie and portion control as
early as elementary age and seeing significant results. (Consolmagno, et al. 2009)

Wearables are an emerging technology that have the ability to increase motivation in
regards to physical activity. "this device merges the physical and the digital, which
offers educators the opportunity to think about mixing two of the hottest educational
trends, gamification and blended learning. (Bull, 2013)

Key components for increasing the physical activity level of middle school students are
providing opportunities that are age-appropriate, varied, and fun. Building skills and
healthy habits that last throughout the lifetime requires access and motivation. (White,
Physical Activity for Middle School Students)

> "Consumer-based wearable activity trackers are now readily available and can
> provide individuals with the ability to objectively monitor their physical activity
> levels. In addition, when combined with the use of smartphone and computer
> apps, they may assist users through a range of motivational and tracking tools to

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better manage their personal health" Lyons, E. J., Lewis, Z. H., Mayrsohn, B. G., &
Rowland, J. L. (2014)

The implementation of the Moki Physical Tracker in combination with MyFitnesspal
Dietary Tracker is a step in the right direction for the mental, physical, and emotional
health of our young students that will help them feel better about themselves and
perform better academically.

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