Summer 2020

Using Visual Prompts and a Raffle to Increase Recycling on Campus

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USING VISUAL PROMPTS AND A RAFFLE TO INCREASE RECYCLING ON CAMPUS

A Master's Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science, Applied Behavior Analysis

By

Heather Marie Felske

May 2020

USING VISUAL PROMPTS AND A RAFFLE TO INCREASE RECYCLING ON CAMPUS

Psychology

Missouri State University, May 2020

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ABSTRACT

Landfills pose a risk to the current level of human development and population growth. Leachates have the potential of polluting the ground water which can cause severe birth defects and decrease the population. When municipal solid waste breaks down it produces methane gas creating debilitating health problems that are fatal. More attention will have to be directed toward sustainable growth by reducing the amount of recyclable materials being discarded as waste. Part of the public affairs mission of Missouri State University is to engage in pro-social behavior and incorporate the student body and community whenever possible. One way of modeling pro-social behavior is to increase student recycling behavior and decrease contamination in recycling plants. This demonstrates an investment in the community and provides a good model for the students. To this end, the university has invested significantly in recycling behavior by purchasing high-quality bins and placing them throughout most of the buildings on campus. In order to increase student recycling of plastic bottles and reduce the contamination of the recycling bins with trash items, the current study used prompts and a raffle to encourage recycling of plastic bottles and accurate placement of items in the bins in Hill Hall and Siceluff Hall. The results suggest that the interventions may have had a modest effect. Obstacles and limitations are discussed before describing how future research may continue productively.

KEYWORDS: municipal solid waste, gamification, visual prompts, recycling behavior, sustainability, contamination

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ACKNOWLEDGEMENTS

I would like to thank the following people for their support during the course of my graduate studies. I am extremely grateful to my Lord and Savior, Jesus Christ, for allowing me to realize all things are possible. I cannot begin to express my deepest appreciation to Dr. Michael Clayton for his generosity and invaluable insight. Without his guidance and instrumentation, my success in graduate school and this thesis would not have been possible. He is a fantastic mentor with immense knowledge about behavior analysis and writing techniques that have truly paved my career path. I also wish to offer a special thanks to Dr. Wayne Mitchell and Dr. Melissa Fallone for their commitment and valuable team membership on the committee. They have provided me with helpful advice and insightful suggestions to arrive at the completion of the thesis process. I appreciate all their time and dedication spent to strengthen my academic abilities. I must also thank Lauren Collins and Shaun Sletten for their unwavering support as research assistants. It was a pleasure working with both of them.

I dedicate this thesis to my husband for being supportive of my behavior while I spent countless hours in dedication to the thesis. I am truly blessed to have such an understanding husband. He has modeled patience to me through the duration of my studies. The beginning of my academic endeavor started with my husband's encouragement for me to obtain a high school equivalency certificate. For that, I am grateful, and he has supported every step of the way.

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INTRODUCTION

Landfills pose a serious risk to the current level of human development and population growth. Leachates pollute the water, methane gas is produced, while contamination is closing recycling plants. Tons of plastic bottles and cans are discarded as trash daily, despite the option to recycle. Plastic products continue to maintain a high generation rate for various reasons. Many plastics are light and can easily travel to the ocean which are fatal to aquatic wildlife. Modeling proper pro-social recycling behavior will decrease recyclable material in landfills and decrease contamination in recycling facilities. In turn, less energy will be used, and natural resources will be reserved. When new products are made it requires more energy than the process of recycling. Sustainable ecological growth is needed that will require individuals to change their behaviors to improve the shared environment. If every person would commit to a clean environment recycling would be a substantial benefit to the world.

In order to fulfill their public affairs mission, Missouri State University has begun to explore sustainability. In particular, ways to increase recycling behavior and decrease contamination in recycling bins. Recyclable materials become municipal solid waste (MSW) when items are mixed with the garbage that damages the environment. When MSW breaks down it produces methane gas that is harmful to humans and animals. The Environmental Protection Agency (2018) records MSW using tonnage. In 2015, the amount of MSW generated was 262.4 million tons (mt), which was a gradual increase to 54.13 mt per year since 1990. For each person, the generation rate was calculated at 4.48 pounds per day during 2015. Of the 137.7 mt of MSW placed in landfills, food (22%), plastic (18.9), paper and paperboard (13.3%) were the

top three materials documented (Environmental, 2018). For plastic to break down in a landfill it would take over one thousand years according to Schultz (2017).

Advantages exist for the use of plastic products which can explain the high generation rates. Hospitals utilize single use plastics to protect the spread of infection such as tubing and clear plastic wrapping on surgical tools. Grocers use plastic bags to make it easy for the customer to carry purchased items. Plastic generated during 2015 calculated at 34.5 million tons, whereas 3.14 mt were recycled (Environmental, 2018). Drzyzga and Prieto (2019) explain how important it is to promote sustainable waste management programs to combat discarded plastic products. Kurtela and Antolović (2019) report that plastic production has increased over time to 300 mt per year. Many of the plastic products are discarded after a single use, which Kurtela and Antolović (2019) explain create a crucial role for state and international governments to address. According to Drzyzga and Prieto (2019) education campaigns that help citizens want to recycle could decrease the demand for plastic.

A major global concern for society cited by Kurtela and Antolović (2019) is plastic contaminants in the ocean. When plastic is not recycled or placed in landfills it can easily flow into the world's oceans. Commendatore (2019) reports that oceans are polluted with 9 mt each year. Being lightweight allows certain plastics to be easily picked up by the wind and carried to the ocean. The amount of plastic flowing down from rivers, estimated by Kurtela and Antolović (2019) is between 1.25 to 2.41 mt per year. They report recycling gained attention once it was clear how harmful plastic pollution is on the ecosystem and its inhabitants. Pollution of plastic in the ocean is a macro issue that could decrease with recycling efforts.

Furthermore, paper products have been recycled at higher rates than plastic according to Waste Management (2017). The Environmental Protection Agency (EPA) recorded paper and

paperboard generation rates for 2015 at 68.5 million tons with 45.42 mt recycled. Municipal solid waste (MSW) has decreased from 87.7 mt of paper in the year 2,000 to 68.1 mt in 2015. Collection bins for paper may be contaminated less than plastic bins, which could explain why plastic has not attained the same decrease in MSW. Waste Management (2017) determined that it only takes one dirty product to contaminate thousands of pounds of plastic or paper, therefore going to the landfill. Additionally, recycling rates for corrugated cardboard (70%), magazines (45%), office paper (45%), newspaper (73%), and when 500 phone books are recycled it can save up to 31 trees and 7,000 gallons of water (Waste, 2017).

For the past several decades, attempts to lower contaminants in recycling containers has been a challenge. David Rachelson (2018), the Vice President of Sustainability at Rubicon Global, reports the recycling contamination crisis has closed over 1,000 recycling plants in California within the past two years. Hubbe (2016) explains how papermakers are producing "stone paper" which is not made from wood but 80% calcium carbonate powder, or limestone. The limestone is forced together chemically with recycled high-density polyethylene creating an unrecyclable product. Paper and plastic that contain added material bring mayhem to recycling facilities. Stone paper can contaminate thousands of pounds of appropriate recyclable paper if it is not separated. Additionally, expensive machines are needed to separate the plastic from the paper coffee cups and most plants cannot afford them. Food or liquid on the items must be washed off before the item can be recycled. A song by Dan Einbender (1989) explains the contamination crisis by singing, "It really isn't garbage 'til you mix it all together."

The average paper cup used to serve coffee in the community can lead many to believe the cup is recyclable. However, a cup made from paper would not be able to withstand the temperature of coffee. Mitchell et al. (2014) explains how paper plastic laminates (PPL) are used

in disposable cups to ensure the coffee does not seep through. When PPL's are added to the cups it creates a paper/plastic product that can no longer be recycled. As for plastic cups, a polyethylene terephthalate (PET) number can be used to identify how the plastic was made. PET defines the temperature used to mold the plastic and percentage of plastic in the product. Plastic cups can be made with recycled materials which lowers the quality of the product, therefore, no longer recyclable. If the PPL number is not known or the cup was not washed before placing it in the recycling bin, it is contamination.

Overall, creating ways to increase recycling behavior and decrease contamination will protect the environment and save energy. Lehman and Geller (2004) explained that when new materials are created it requires more energy and produces more greenhouse gas than recycling, plus new materials deplete natural resources. Albertarelli et al. (2018) encouraged users of energy and water towards conservation with principles of gamification in "Games with a Purpose" to alter or reinforce the participants behavior and attitude. An opportunity exists to apply gamification to ordinary behavior, such as recycling, to conserve energy by inducing behavior change within the gamer. Manufacturers of recycling receptacles have participated in gamification by creating bins with separate sections for waste, plastic and paper to address contamination. Reinforcement follows because universities are buying the bins and using them to make a global difference by recycling properly to reduce contamination; which also benefits the community.

LITERATURE REVIEW

Visual Prompts

The effects of visual prompts to increase recycling behavior are important to understand in order to determine sustainability programs that are effective. Witmer and Geller (1976) conducted a study at Virginia Polytechnic Institute and State University in six dorm rooms. The visual prompts used were poster boards attached on bulletin boards with information about a recycling program. A second prompt was placed under the door of every dorm room. Paper fliers used as stimuli listed the consequences for the participants recycling behavior. Values itemized by Witmer and Geller (1976) were to "Preserve our natural resources, protect the environment, save trees, and alleviate the paper shortage" (p. 317). Visual prompts unaccompanied by additional treatment variables were reported by the authors to be the least effective intervention method.

Austin, Hatfield, Grindle, and Bailey (1993) examined the results of informative prompts to recycle. Two visual aids were used in each department that were placed above the trash and recycling bin. For the landfill receptacle the sign was red, and the recycling prompt was green. Both prompts listed the appropriate items to be placed in each container. The results from this study provided supporting evidence that signs were able to increase recycling. However, a few obstacles discovered by Austin et al. (1993) were that visual prompts may have only served as a simple reminder or to inform patrons of the location of the recycling center.

Previous studies provide evidence that posting signage does increase recycling behavior and decrease contamination. According to Sussman, Greeno, Gifford, and Scannell (2013) inexpensive signs increased composting behavior in the proper bins at a Canadian University.

They reported that of 1,081 participants only 12 patrons contaminated the composite bin with a noncompostable item. Durso (2017) found that neon signs at a Louisiana State University game to promote appropriate use of recycling bins was an important variable to increase recycling.

By the same token, other studies support their hypothesis that visual prompts alone do not increased recycling behavior, except when accompanied by additional treatments (e.g., Witmer & Geller, 1976; Werner, Stoll, Birch, & White, 2002; Andrews, Gregoire, Rasmussen, & Witowich, 2013). A combination of visual prompts and proximity of the bins was not enough to encourage high levels of recycling in a 2016 study by Miller, Meindl, and Caradine. A study by Fritz et al. (2017) used signs that stated, "Please recycle and dispose of trash. Recycling bins and trashcans are located in the hallway" (p. 827). Results of this study provided evidence that location of the containers is what increased recycling behavior. Fritz et al. (2017) concluded researchers were unable to determine the extent to which prompts (signs) reinforced recycling. On the other hand, Austin et al. (1993) revealed previous research on signage was not the intervention variable that prompted individuals to recycle.

In each of the studies noted, there was a criterion that each visual prompt had to uphold. The results for the Austin et al. (1993) study met the criteria listed by Geller, Winett, and Everett (1982) for prompts that are not attended by some consequence. Other researchers suggest the signs alone must contain other variables to be effective such as making requests, near the area of expected response, and are convenient for the individual (e.g., Geller et al., 1982; Austin et al., 1993). This evidence supports the idea that visual prompts are effective only when there is assistance from other factors that produce high levels of recycling behavior.

Gamification

For the past decade, gamification research has illuminated its effectiveness for producing behavior change. Deterding, Dixon, Khaled, and Nacke (2011) stated that the purpose of gamification is to achieve "gamefulness." They explain gamefulness as the quality of the behavior and the experience, whereas gamification takes "Game design elements and applies them in non-game contexts" (p. 9). To be classified as gamification, per Deterding et al. (2011), the following fundamentals must be present, "The use rather than the extension of; design rather than game-based technology or other game related practices; elements rather than full-fledged games; characteristic for games rather than play or playfulness; and are used in non-game contexts regardless of specific usage intentions, contexts, or media of implementation" (p. 13).

Gamification is defined by Morford, Witts, Killingsworth and Alavosius (2014) as, "A process by which nongame activities are designed to be more like a game" (p. 25). Games and gamification are not terms that should be used interchangeably. Çeker and Özdamlı (2017) investigate gamification to further explain what it is because of the varying definitions. They report that numerous research articles are using game and gamification as synonyms that can confuse the readers. Gamification uses principles of games to help modify human behavior that can be viewed as a learning philosophy. In education, gamification can be used to increase the student's interest in class materials. Landers et al. (2019) determined that gamification interventions must create gamefulness or they are not, by definition, gamification.

According to Hopson (2012) gamification is rooted in contingencies, not in games. Cooper, Heron, and Heward (2007) describe contingencies as dependent and temporary relationships between operant behavior and the variables that have control over behavior. Contingencies are explained by Hopson (2001) as rules that determine when rewards are given.

Hopson (2001) emphasizes how B. F. Skinner provided strong incentives toward game design with lever pressing rats. Contingencies are an important factor when investigating gamification to understand what is causing the individual to participate in the activity. If the behavior is to increase with gamification, contingencies provide value to understand variables that will maintain the desired behavior gamification is teaching.

Current Study

Results from previous research provide supportive evidence that signs should be accompanied by additional variables to increase recycling behavior and decrease contamination (e.g., Witmer & Geller, 1976; Werner et al. 2002; Austin et al., 1993; Andrews et al., 2013; Miller, Meindl & Caradine 2016; Fritz et al., 2017). Gamification has the ability to modify animal and human behavior by taking game design elements and applying them in the natural environment (e.g., Hopson, 2001; Deterding et al., 2011; Morford et al., 2014; Landers et al., 2019). The current study used visual prompts, including floor stickers and wall signs, and a public raffle, to increase plastic recycling and reduce contamination in a teaching building on a university campus. Research compliance was granted for the current study by the Institutional Review Board at Missouri State University on August 30, 2019 (see Appendix).

METHOD

Participants and Setting

The study took place in two teaching buildings of comparable size and function at Missouri State University. On the control floor in Building A, 904 unique students took classes from a variety of 42 professors. In Building B, 659 students were enrolled in classes held on floor 2, taught by 24 different instructors. Floor 3 had 643 students and 29 professors. An estimate for total participants to include staff and visitors for the control was 1000, and 700 for floor 2 and 3. Each floor of the buildings had two recycling receptacles, one at each end of the building. The receptacles included three separate bins for bottles, paper, and landfill items, respectively. (see Figure 1)

Research Design

A multiple baseline design was applied across floors in the building to determine the effectiveness of the treatments.

Data Collection

Data collection took place each Friday afternoon between 2:53 to 4:55 p.m. for the duration of the study. Only one exception occurred on October 4, 2019 when data were collected between 12:49 to 1:57 p.m. This time was selected due to the low amount of foot traffic during those hours when data could be separated and counted. Data collection lasted for a total of 13 weeks which included all treatment conditions. Between one and three research assistants were

utilized to collected data. Responsibilities included counting, recording, adding, noting, and assisting with set up and take down of treatment phases.

Research assistants wore protective gloves on their hands before separating the bottles and cans from the recycling bin into tall kitchen 13-gallon trash bags. All items that were not bottles or cans were placed in front of the bin on the floor. The landfill bin was sifted through in order to identify bottles and cans. All research assistants had to view the bottom of the landfill bag to insure they viewed all of the contents.

To count the number of bottles, an assistant would remove a bottle from the trash bag, then place it back into the recycling bin. During that time, research assistants would count simultaneously, yet independently. After the count was complete, assistants would record the number of bottles on the data recording sheet. Next, assistants counted the number of cans in the remaining bag with the same procedure used for the bottles. After both bags were counted, the number of bottles and cans were added together. Research assistants would then move to the opposite end of the hallway, east or west, and collect the data from the bins using the same procedure. Assistants added the number of bottles and cans to obtain a total count of bottles/can per bin locations, east or west, and per floor.

Items that were already placed on the floor in front of the bin were documented in two ways. First, the number of plastic and paper cups were counted and recorded on the data recording sheet as contamination (see Figure 2). Cup types varied by vendor and style that were listed in the notes section of the data recording sheet. Second, assistants sifted through the additional contents on the floor and documented them before placing them in the landfill receptacle. Contamination found in the recycling bin were plastic store bags, yogurt containers, candy wrappers, chip bags, plasticware, disposable food containers, and food storage baggies.

Papers were found in the bottle/can bin which should have been placed in the paper receptacle. Glass bottles found in the recycling bin were the only other item that was found in the bin that was recyclable. However, glass items were not within the scope of this study but were documented in the notes section. Additionally, bottles and cans counted from the landfill bin were documented as contamination.

Measures

The dependent variables for proper recycling consisted of the number of bottles and cans counted from the recycling container. Plastic bottles and aluminum cans varied between vendors and assortment of contents contained inside. Types of content included soda, water, juice, tea, lemonade and energy drinks. A variation of size in length and width existed between the bottles and cans counted. Bottles and cans were empty, contained liquid, or had items placed inside such as paper, plastic lids or miscellaneous items.

The dependent variables for contamination consisted of the number of plastic and paper cups counted from the recycling bins. These cups varied by vendor, size and content contained inside. Many cups still contained liquid or were not rinsed before being discarded. Cups either had a lid attached or did not have one. However, lids were not counted as contamination or documented for this study. A second way contamination was measured was by the number of bottles and cans found in the landfill receptacle. This was counted as contamination because the bottle/can should have been placed in the recycling container which was in proximity of less than 18-inches.

The entrance to the paper bin was too narrow for a can or plastic bottle to enter. Therefore, no data were collected from the receptacle and paper was not included in this study.

Interobserver Agreement

Interobserver agreement (IOA) was evaluated by having two observers count the number of bottles, cans or cups simultaneously but independently. IOA was assessed for 62% of data collection during the last eight out of 13 weeks. A total count IOA algorithm was used to determine the percentage of agreement between the observers. The frequency of individual bottles, cans or cups being placed back into the bins was the behavior that was observed. This was done by analyzing the data sheet and comparing the number of bottles, cans and cups recorded by observers. The smaller number of items counted was divided by the larger number of items and then multiplied by 100. The percentage of correct agreement between the researcher assistants was 100% in all three categories and on all occasions that the data were collected.

PROCEDURE

Baseline

Building A served as a baseline-only control condition for the duration of the study that lasted for 13 weeks. Building B utilized floors two and three to implement two treatment conditions. Baseline was analyzed for three weeks on floor two and six weeks on floor number three.

Treatment

Signs were applied as the first independent variable after baseline was established. Prompts included signs that were hung above the bottle/can, paper and landfill bin (see Figures 3, 4 & 5). Two stickers were taped to the floor in front of the recycling container that comprised of a large, green arrow that pointed toward the recycling bin, and another that contained the words, “Please Recycle” that were positioned between the bin and arrow (see Figure 6). Signs were hung once the baseline data was collected for the allotted time period. Visual prompts were analyzed for five weeks on floor two and four weeks on floor three.

A raffle was the second independent variable that was measured. A poster was hung above the bin with instructions for the gamer to play the raffle (see Figure 7). Signs were hung to direct users to email an ABC contingency to receive a raffle ticket. Two sentences, or words, and a photo were requested via email to receive a raffle ticket. The contingencies addressed why the individual recycled (Antecedent; word or sentence), photo of an item being recycled, or cup being placed in the landfill bin (Behavior, photo); and a benefit to recycle (Consequence, word or sentence). A visual example of an appropriate ABC’s example was posted on two 11 by 8.5-

inch papers and was taped to the poster above the bin (see Figures 8 recycling, Figure 9 landfill). Floor numbers were secured on top of the landfill and recycling bins to keep the raffles separate. A picture with items that do not belong in the bin replaced the visual prompt above the recycling receptacle (see Figure 7).

A raffle ticket number was emailed to the player once all required information was provided. Raffles happened weekly with a twenty-dollar Wal-Mart gift card as the prize. The drawing required two witnesses on Friday at the end of the week the raffle was being implemented. When the raffle began signs were hung in all classrooms per floor which stated, "RECYCLE & WIN $$$ CHECK THE HALLWAY FOR INSTRUCTIONS." After baseline and Sign condition data was collected, the raffle signs were displayed to start gamification. The Raffle condition was analyzed for five weeks on floor two and three weeks on floor three.

RESULTS

Recycling

Figure 10 displays the results in a multiple-base line design. The x-axis contains the treatment phases which correspond to the y-axis that represent the dependent variable for proper recycling. Baseline on floor two (1,16), (2, 33), (3, 19) was significantly lower each week in comparison to floor three (1, 64), (2,93), (3, 39), (4, 66), (5,83), (6, 108). Treatment one was implemented first at coordinate (4, 55) which had an increase of 36 points between baseline and phase two. The mean score at baseline was 22.66 which increased to 65 during treatment one. An increase of 42.34 points does provide supporting evidence that prompts did increase recycling behavior. However, with further analysis in comparison with floor three, the data does not substantiate an increase in recycling. Baseline had a mean score of 75.5 and decreased by 0.5 during treatment one (M=75) which began at coordinate (7, 131).

During the third phase, starting at coordinate (9, 110) a brief visual analysis of the multiple baseline shows an increase of 22 points between the two treatment conditions. The last coordinate for the second phase was at (8, 88). Additional analysis of mean scores between treatment one (M=65) and treatment two (M=64.4) provides evidence of a very minimal decrease in proper recycling. This may be due to a celling effect that may have occurred from treatment one. At coordinate (11, 44) phase three began with an increase of 25 points from coordinate (10, 19) that marked the end of treatment one. Visual analysis between phase changes could propose an increase in recycling, until the mean score is evaluated. Treatment one provided a mean score of 75 on floor three and increased by 1 during the second treatment. This is not a significant increase in recycling behavior that may be due to celling effects of treatment one as well.

Contamination

Figure 11 provides data on the ordinate for the dependent variable for contamination that coordinates with the abscissa for the phases. Phase one was implemented from coordinates (1,4) through (3, 0). Results from the dependent variable provided a mean score of 6.67. This was slightly lower than floor three (*M*=8.83) which was in phase one from (1, 11) to (6, 8). Treatment one started at (4, 3) with a mean score of 6.8 for the duration of the phase. Followed by implementation of treatment two at coordinate (9, 7) which increased contamination by 4 points from coordinate (4, 3). The mean score for treatment two was 6.2. Analysis of the mean scores from floor two did not provide significant results of an increase or decrease in contamination.

Although, floor three did provide supportive evidence of a decrease in contamination in accordance with the mean scores between phase changes. Treatment one started at coordinate (7, 5) and treatment two at (11, 6). Analysis of the mean scores show that baseline (*M*=8.83), treatment one (*M*=2.25), and treatment two (*M*=3) do provide evidence of a decrease. The decrease between phase one and treatment one was 6.58 in the mean scores. However, the analysis of treatment one, in comparison between floor two and three provide differing results which makes the data inconclusive as a whole.

The amount of contamination (e.g. bottle/can) found in a single landfill bin was between one and three bottles/cans.

DISCUSSION

Prompts provided different results between the two floors that received treatment in Building B. Floor two showed an increase in recycling behavior according to the mean scores when prompts were added (baseline *M*=22.66; prompt *M*=65). The analyzation of mean scores provided supporting evidence that prompts were effective to increase recycling behaviors. Signs on the floor used as visual prompts asking participants to "Recycle Please," may have been influential. Additional signs posted above the bins were used in combination with the floor signs to provide adequate information about proper recycling. Individuals passing the bins had exposure to the prompts that could have encouraged patrons to recycle. A combination of the different prompts was part of the treatment that had the main impact, which appears to have increased recycling behavior that produced celling effects.

However, floor three maintained a mean of approximately 75 between all three phases of the multiple baseline design. Data from floor three suggested that neither treatment had any effect on recycling behavior (baseline, *M*=75.5), (treatment 1, *M*=75), and (treatment 2, *M*=76). One limitation of this study was not having control over when the bins were emptied. Content of the bins were typically emptied on Mondays, unless it became full and needed to be dumped earlier in the week. On several occasions, the bins were full on Wednesday which was witnessed by research assistants and had no content or very few items on Friday when data were collected. This was documented on two separate occasions but there is a concern it may have happened more often. If this is the case, the data would be skewed, and recycling behavior may have increased drastically. Treatment may have made such an effect that the bins could have been

getting emptied more than once per week. Data, however, was only collected on Friday afternoon.

A control was implemented in Building A to increase the reliability of the results. Baseline level data on the control floor (*M*= 59) provided additional concerns about prompts increasing recycling behavior on floor two (*M*= 65). The data points only differ by six points which raise questions about the effectiveness of the prompts across settings. A baseline mean score of 75 on floor three provided supporting evidence that prompts were not the variable for increased recycling.

The Raffle condition did not produce significant results between treatment phase changes on floor two (sign *M*=65; raffle *M*=64.4), or floor 3 (sign *M*=75; raffle *M*=76). A purpose of this study was to understand if gamification, in the form of a raffle, could increase recycling behavior and decrease contamination. The signs posted for the raffle were not effective in prompting individuals to play. One person received a raffle ticket from playing the game on floor two. No tickets were assigned for the raffle for floor number three. The same obstacle existed for the data collected for the raffle, in that, data collection procedures did not get an accurate count of all bottles/can per floor if bins were emptied ahead of scheduled pick-up times.

With only one person playing the raffle there was not enough data to determine to effectiveness of the ABC Model or social validity. For all players who received a raffle ticket, the plan was to email a survey about the raffle. Questions created were going to be used to determine the effect of the ABC Model and participant satisfaction with the intervention procedures. Once the survey was returned an additional raffle ticket would have been assigned by email. Then, the participant would have the opportunity to win a Wal-Mart gift card.

Several limitations for the poster should be noted which relate to location and time needed to play. Posters with information on how to play the raffle were hung above the bins. The signs were 42” by 36” that were large enough to be seen. However, the wall above the bins are indented into the wall by about 18 inches. It may have helped if lights were hung around the poster to make them more obvious. Another possibility is that the signs should have been hung at the ends of the hallways, instead of above the bins. When individuals arrive at their floor or get off the elevator the signs could have been more visible.

Additional signs with instructions to play the raffle were hung on the wall by the door to exit all the classrooms. This was to provide additional stimuli to encourage students and professors to play the raffle. Based on the number of people who played the raffle, classroom signs did not increase the number of raffle tickets issued. It is suspected that prompts may have made such an impact that it made the Raffle condition inconclusive. Gamification was significantly impacted by not having participants in the raffle. There are several limitations that may have impacted the potential gamers from playing. Lighting, location of signs, time, hallway foot traffic, or lengthy instructions are all variables which may have obstructed participation.

Instruction to play the raffle, however, did provided clear guidelines and precise instruction on how to successfully gain a raffle ticket. The process required two sentences and a photo be emailed to RaffleForRecycling@gmail.com. Originally the details did not seem to be lengthy but may have impeded players from attempting to get a raffle ticket. It is possible that two sentences and a photo was too much information to request. Although, it was a simple process to complete it may have been too time consuming to stop and play the game. To increase the number of individuals participating in gamification, a QR code may have been a more effective way to decrease the amount of time to play the raffle.

When classes end on both floors there is high amounts of foot traffic in the hallways near the bins. This could have impeded potential players from playing the raffle. It could take anywhere from 30 seconds to several minutes to take a picture at the bin with the recycled product and email it. Stopping in the hallway to play the raffle could have made a player uncomfortable. Being near the bin in the hallway was obvious to bystander's that the individual was playing the raffle, which did not provide confidentiality in playing the game. Other possibilities may have made the potential player uncomfortable such as being in the way of others trying to recycle. Numerous possibilities exist to explain why there was not a higher rate of participation in the raffle.

A major concern in this study that led to future research ideas was the inaccurate measurements of the dependent variables. Data (e.g. bottles, cans, cups) could not be counted correctly when the bins were emptied ahead of schedule. Treatment conditions may have created high levels of recycling behaviors which could have resulted in the bins being filled quickly. In turn, the bins had to be emptied ahead of schedule. On one occasion the sustainability department located the bags that contained the bottles and cans and provided a count. However, the bins were emptied an unknown number of times ahead of schedule. For future research ideas in this area, it will be crucial to formulate a system to make sure all data can be counted per week. A research assistant could collect the data daily and place it in a storage room until the end of the week. This will be important especially when the treatment phases start.

Another limitation in this study was due to only one person playing the raffle. This may have been attributed with flaws within the poster or the amount of time needed to play. A more appropriate location for the poster could be at the end of the buildings where the potential player would view the poster exiting the stairs or elevators. Also, Christmas lights could be positioned

around the poster to draw attention to the information about the raffle. Instructions were detailed with visual examples of how to obtain a ticket. Although, future raffles should contain a simpler contingency to receive a ticket that would be less time consuming. Also, a 20-dollar Wal-Mart card may have not been substantial enough to create gamers for the raffle. A suggestion is to increase the prize to 50-dollar Wal-Mart cards to increase participation.

General findings in this study suggest that more research efforts are needed to invent ways to use gamification to increase recycling behavior and decrease contamination on campus. Gamification is an effective technique that uses, "Game design elements and applies them in non-game contexts," according to Deterding et al. (2011, p. 9). Creating a more detailed research design of the raffle or implementing gamification at another location may provide more substantial results. A public library may be a starting point to determine if the flaws in time to play the raffle were just due to busy student and professors schedules. Another idea for game design could be a computerized game at the bin location, but this could be costly.

A social validity questionnaire should be used in future research on recycling behavior. A survey with questions such as: Was the recycling program easy to understand; I will continue to recycle in the future; The recycling program should continue on campus; and
I believe that increased recycling on campus is important, were going to be emailed to players of the raffle. To get players to respond, an additional raffle ticket was going to be assigned to each person who returned the completed questionnaire. However, researchers in this study were unable to provide the survey due to a lack of participation in the raffle. The first step in accomplishing this task could be to find ways to increase participation in the raffle. Questionnaires are important to understand if the participants were satisfied with the intervention procedures. Open-ended questions could be used to solicit opinions from the participants.

Detailed questions could be asked to improve the conditions of the following studies on research in this area. It would be an effective way to understand if the participants will continue with healthy recycling behaviors that include contamination reduction.

To this end, a demonstration was provided as an investment to the community at Missouri State University. High-quality bins allow the students to model proper recycling behavior while reducing contamination. Research in this area is crucial to understand what is needed to improve recycling behaviors on campus. If the research could help new behaviors form and become a part of the individual's behavioral repertoire, it is the start to clean up contamination in the landfills and recycling plants. On another scale, recycling plants could produce new items with the old recycled material that are not discarded due to contamination, which will use less energy and conserve natural resources.

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Figure 1. Receptacles included three separate bins for bottles, paper, and landfill items

Name of Research Assistant: _____
Date and Time: _____
Location = E – East door near National, W – west door football stadium side

Siceluff - Floor 2

Bin Type Hill Hall	Floor/ Location	Number of bottles	Number of cans	Total cans/bottles	Paper/ Plastic cups
Recycle	C2 – E				
Landfill	C2 – E				N/A
Recycle	C2 – W				
Landfill	C2 – W				N/A

Notes (please label with bin type and location):

_____

_____

Hill Hall - Floor 2

Bin Type Hill Hall	Floor/ Location	Number of bottles	Number of cans	Total cans/bottles	Paper/ Plastic cups
Recycle	2 – E				
Landfill	2 – E				N/A
Recycle	2 – W				
Landfill	2 – W				N/A

Notes (please label with bin type and location):

_____

_____

Hill Hall - Floor 3

Bin Type Hill Hall	Floor/ Location	Number of bottles	Number of cans	Total cans/bottles	Paper/ Plastic cups
Recycle	3 – E				
Landfill	3 – E				N/A
Recycle	3 – W				
Landfill	3 – W				N/A

Notes (please label with bin type and location):

_____

_____

Figure 2. Data collection sheets

Figure 3. Visual prompt that was hung above the bottles/can receptacle

Figure 4. Visual prompt that was hung above the paper receptacle

Figure 5. Visual prompt that was hung above the landfill bin

Figure 6. Treatment one – visual prompt condition

Figure 7. Treatment two – raffle condition

Email ABC's to RaffleForRecycling@gmail.com

Example of ABC's

A – I recycled to get a raffle ticket.

B – The actual photo

C – When I recycle it decreases contamination in the landfill.

Figure 8. An example of an acceptable photo to increase recycling behavior

Email ABC's to RaffleForRecycling@gmail.com

Example of ABC's to prevent contamination

A – "I want to recycle properly."

B – The actual photo

C – "Lack of contamination in the recycling bin helps keep recycling plants open."

Figure 9. An example of an acceptable photo to decrease contamination in the landfill

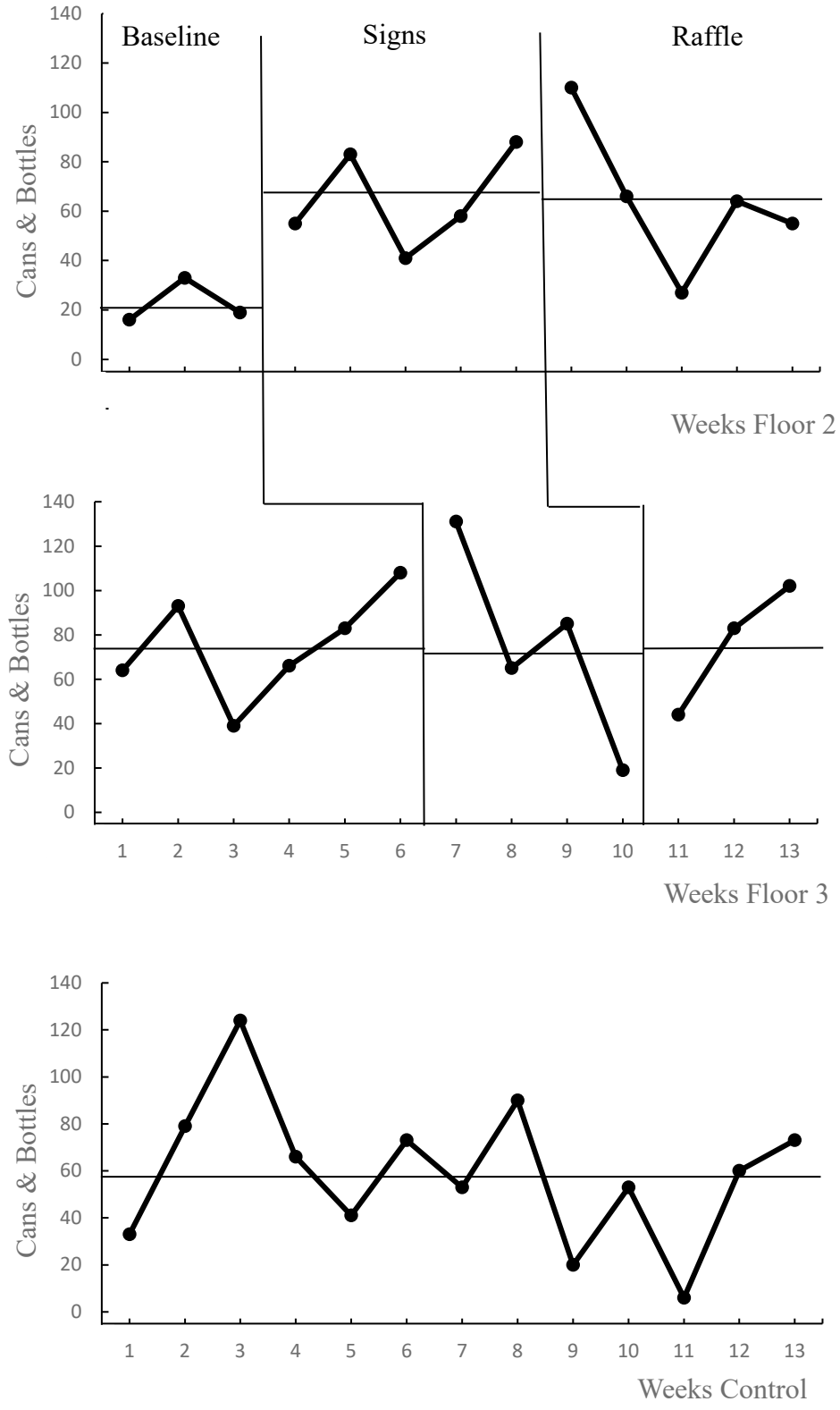


Figure 10. Number of bottles and cans per week recorded from the recycling bin

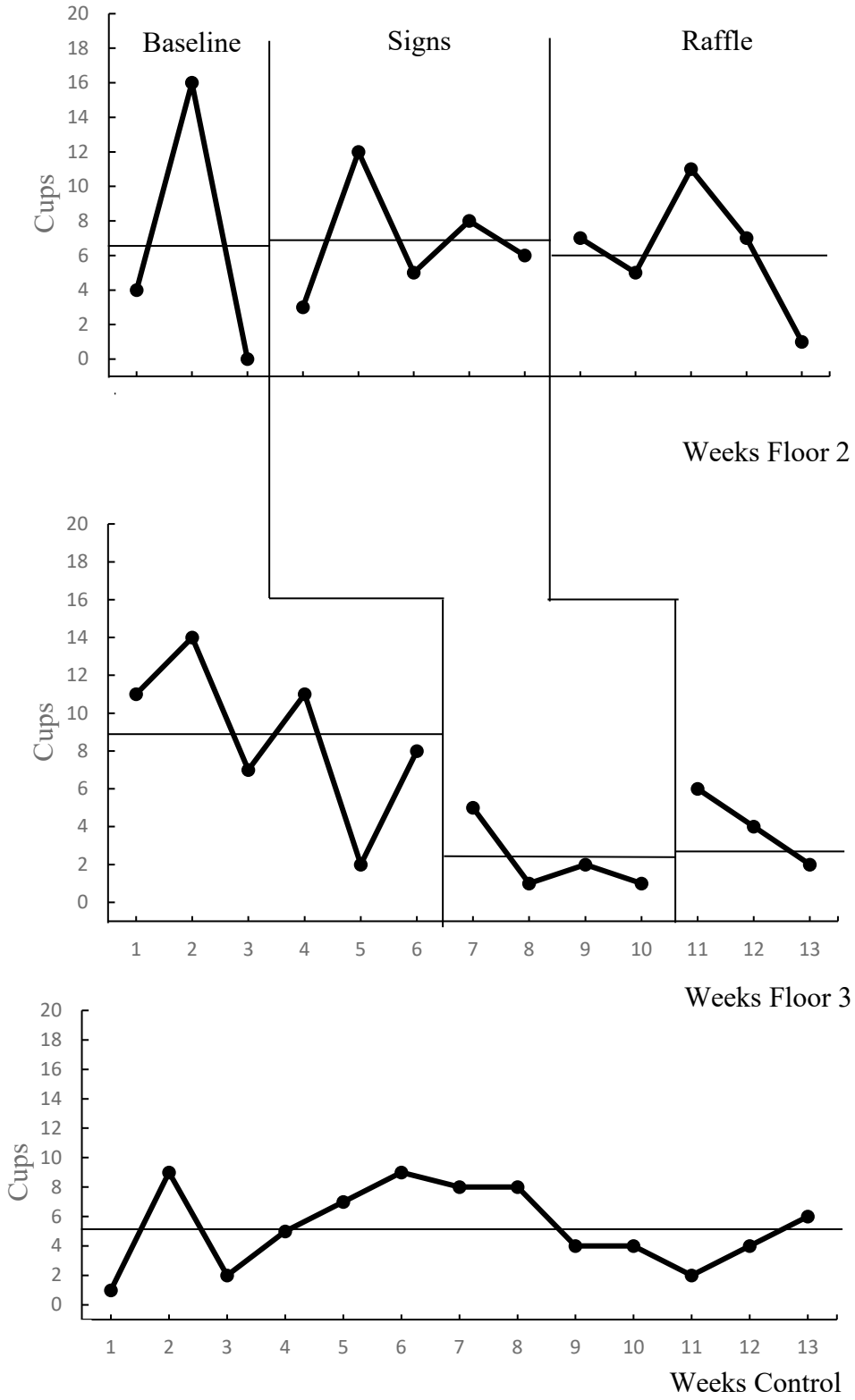
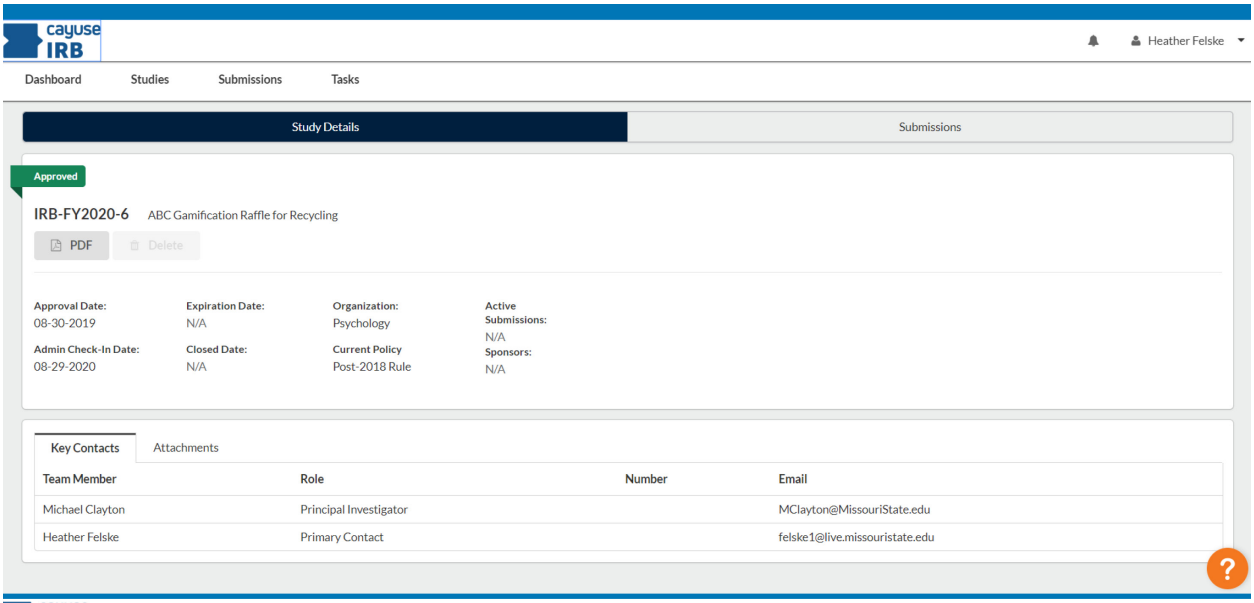


Figure 11. Number of cups per week found in the recycling bin counted as contamination in the recycling bin

APPENDIX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Sponsors:
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Key Contacts
Attachments
Team Member
Role
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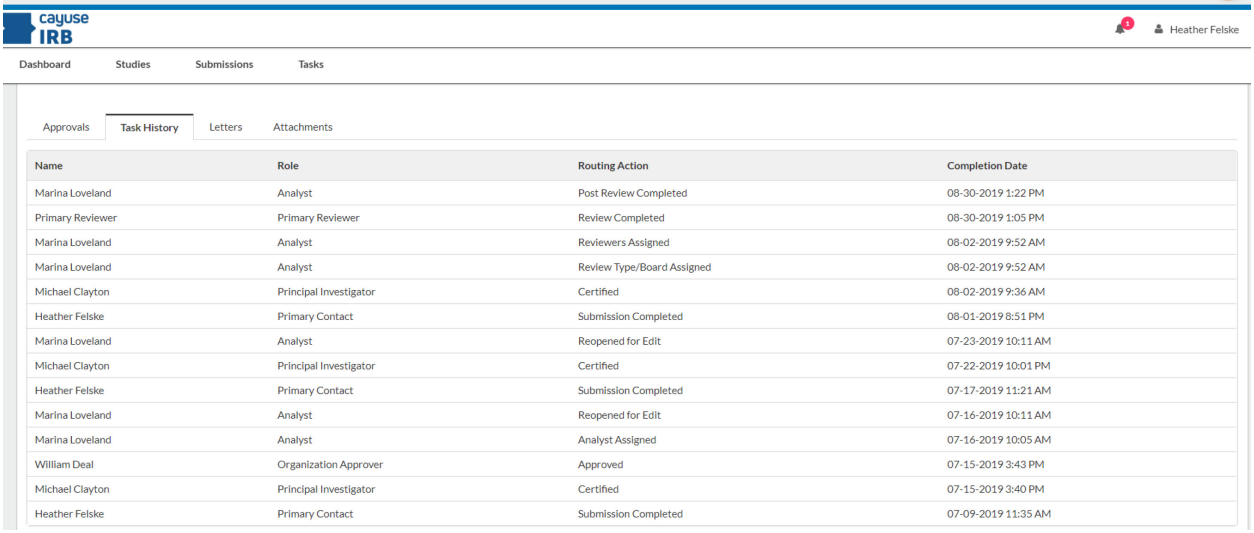
Email
Michael Clayton
Principal Investigator
MClayton@MissouriState.edu
Heather Felske
Primary Contact
felske1@live.missouristate.edu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Michael Clayton
Principal Investigator
Certified
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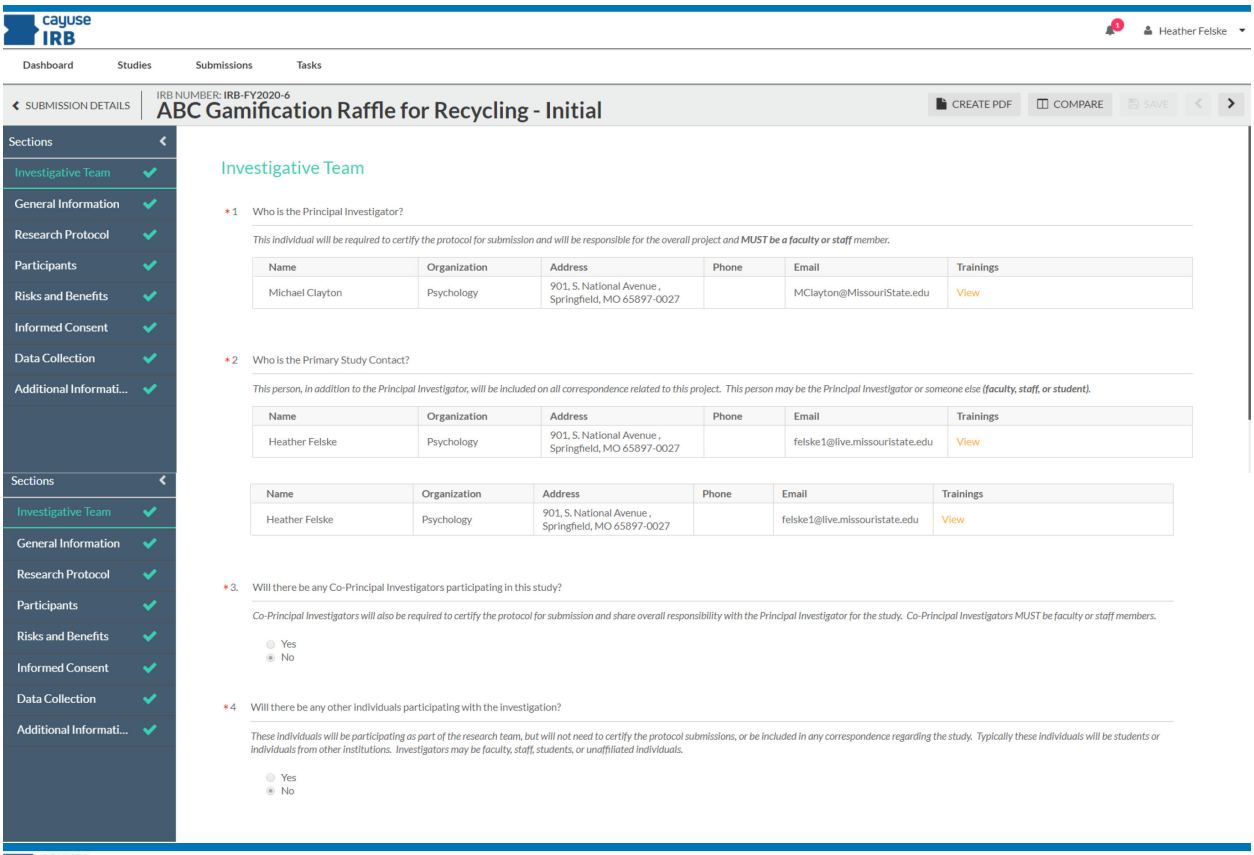
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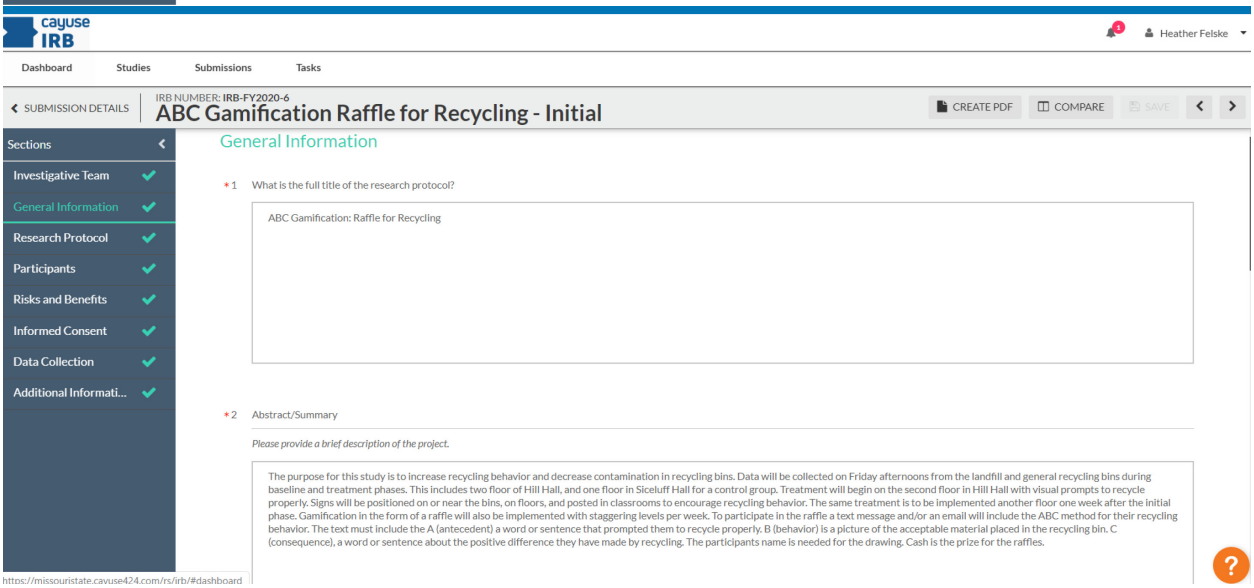
Investigative Team
* 1 Who is the Principal Investigator?
This individual will be required to certify the protocol for submission and will be responsible for the overall project and MUST be a faculty or staff member.
Name | Organization | Address | Phone | Email | Trainings
Michael Clayton | Psychology | 901, S. National Avenue , Springfield, MO 65897-0027 | | MClayton@MissouriState.edu | View
* 2 Who is the Primary Study Contact?
This person, in addition to the Principal Investigator, will be included on all correspondence related to this project. This person may be the Principal Investigator or someone else (faculty, staff, or student).
Name | Organization | Address | Phone | Email | Trainings
Heather Felske | Psychology | 901, S. National Avenue , Springfield, MO 65897-0027 | | felske1@live.missouristate.edu | View
Name | Organization | Address | Phone | Email | Trainings
Heather Felske | Psychology | 901, S. National Avenue , Springfield, MO 65897-0027 | | felske1@live.missouristate.edu | View
* 3. Will there be any Co-Principal Investigators participating in this study?
Co-Principal Investigators will also be required to certify the protocol for submission and share overall responsibility with the Principal Investigator for the study. Co-Principal Investigators MUST be faculty or staff members.
Yes
No
* 4 Will there be any other individuals participating with the investigation?
These individuals will be participating as part of the research team, but will not need to certify the protocol submissions, or be included in any correspondence regarding the study. Typically these individuals will be students or individuals from other institutions. Investigators may be faculty, staff, students, or unaffiliated individuals.
Yes
No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General Information
* 1 What is the full title of the research protocol?
ABC Gamification: Raffle for Recycling
* 2 Abstract/Summary
Please provide a brief description of the project.
The purpose for this study is to increase recycling behavior and decrease contamination in recycling bins. Data will be collected on Friday afternoons from the landfill and general recycling bins during baseline and treatment phases. This includes two floor of Hill Hall, and one floor in Siceluff Hall for a control group. Treatment will begin on the second floor in Hill Hall with visual prompts to recycle properly. Signs will be positioned on or near the bins, on floors, and posted in classrooms to encourage recycling behavior. The same treatment is to be implemented another floor one week after the initial phase. Gamification in the form of a raffle will also be implemented with staggering levels per week. To participate in the raffle a text message and/or an email will include the ABC method for their recycling behavior. The text must include the A (antecedent) a word or sentence that prompted them to recycle properly. B (behavior) Is a picture of the acceptable material placed in the recycling bin. C (consequence), a word or sentence about the positive difference they have made by recycling. The particlpants name is needed for the drawing. Cash is the prize for the raffles.
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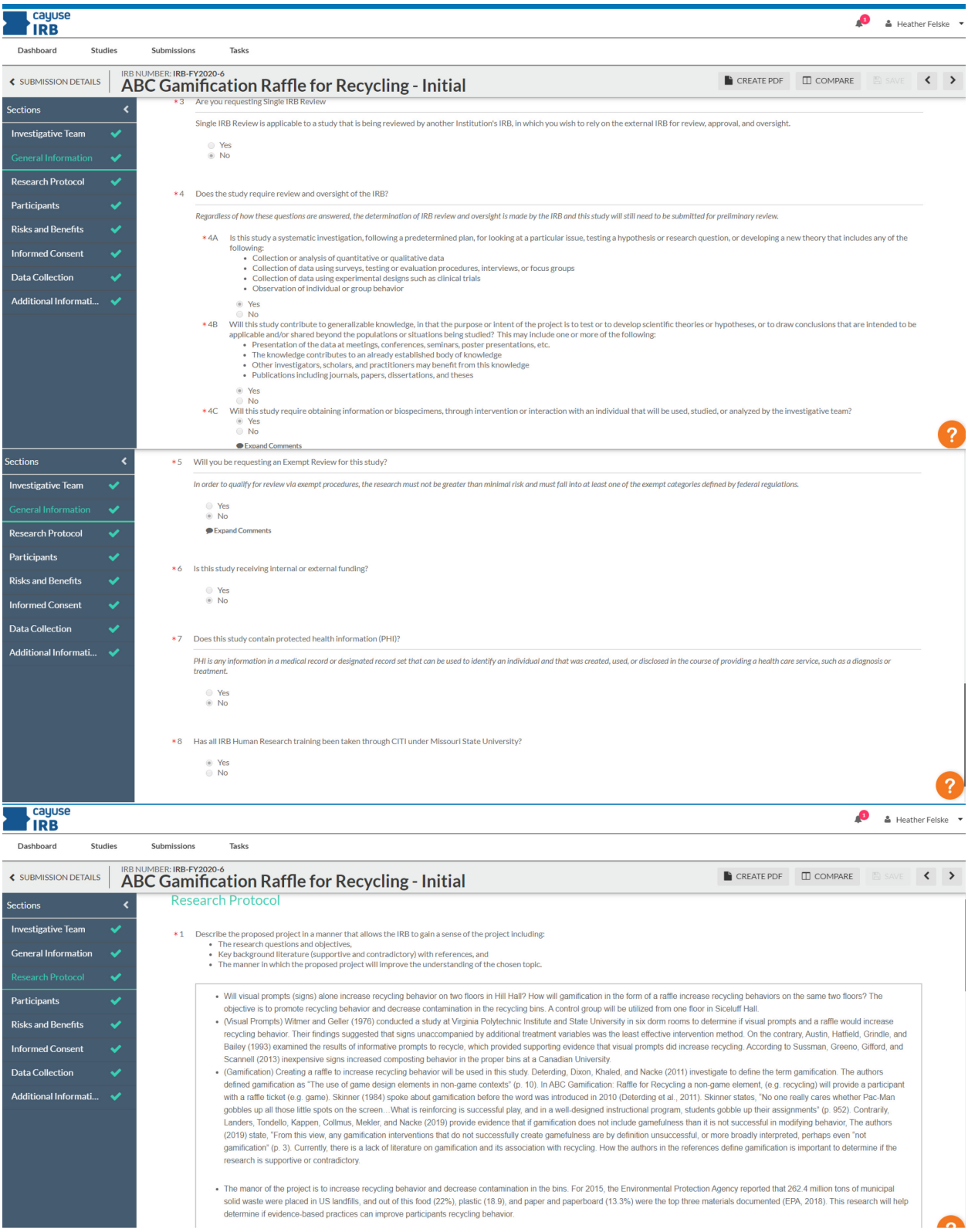
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*3 Are you requesting Single IRB Review
Single IRB Review is applicable to a study that is being reviewed by another Institution's IRB, in which you wish to rely on the external IRB for review, approval, and oversight.
Yes
No
*4 Does the study require review and oversight of the IRB?
Regardless of how these questions are answered, the determination of IRB review and oversight is made by the IRB and this study will still need to be submitted for preliminary review.
*4A Is this study a systematic investigation, following a predetermined plan, for looking at a particular issue, testing a hypothesis or research question, or developing a new theory that includes any of the following:
Collection or analysis of quantitative or qualitative data
Collection of data using surveys, testing or evaluation procedures, interviews, or focus groups
Collection of data using experimental designs such as clinical trials
Observation of individual or group behavior
Yes
No
*4B Will this study contribute to generalizable knowledge, in that the purpose or intent of the project is to test or to develop scientific theories or hypotheses, or to draw conclusions that are intended to be applicable and/or shared beyond the populations or situations being studied? This may include one or more of the following:
Presentation of the data at meetings, conferences, seminars, poster presentations, etc.
The knowledge contributes to an already established body of knowledge
Other Investigators, scholars, and practitioners may benefit from this knowledge
Publications including journals, papers, dissertations, and theses
Yes
No
*4C Will this study require obtaining information or biospecimens, through intervention or interaction with an individual that will be used, studied, or analyzed by the investigative team?
Yes
No
Expand Comments
*5 Will you be requesting an Exempt Review for this study?
In order to qualify for review via exempt procedures, the research must not be greater than minimal risk and must fall into at least one of the exempt categories defined by federal regulations.
Yes
No
Expand Comments
*6 Is this study receiving internal or external funding?
Yes
No
*7 Does this study contain protected health information (PHI)?
PHI is any information in a medical record or designated record set that can be used to identify an individual and that was created, used, or disclosed in the course of providing a health care service, such as a diagnosis or treatment.
Yes
No
*8 Has all IRB Human Research training been taken through CITI under Missouri State University?
Yes
No

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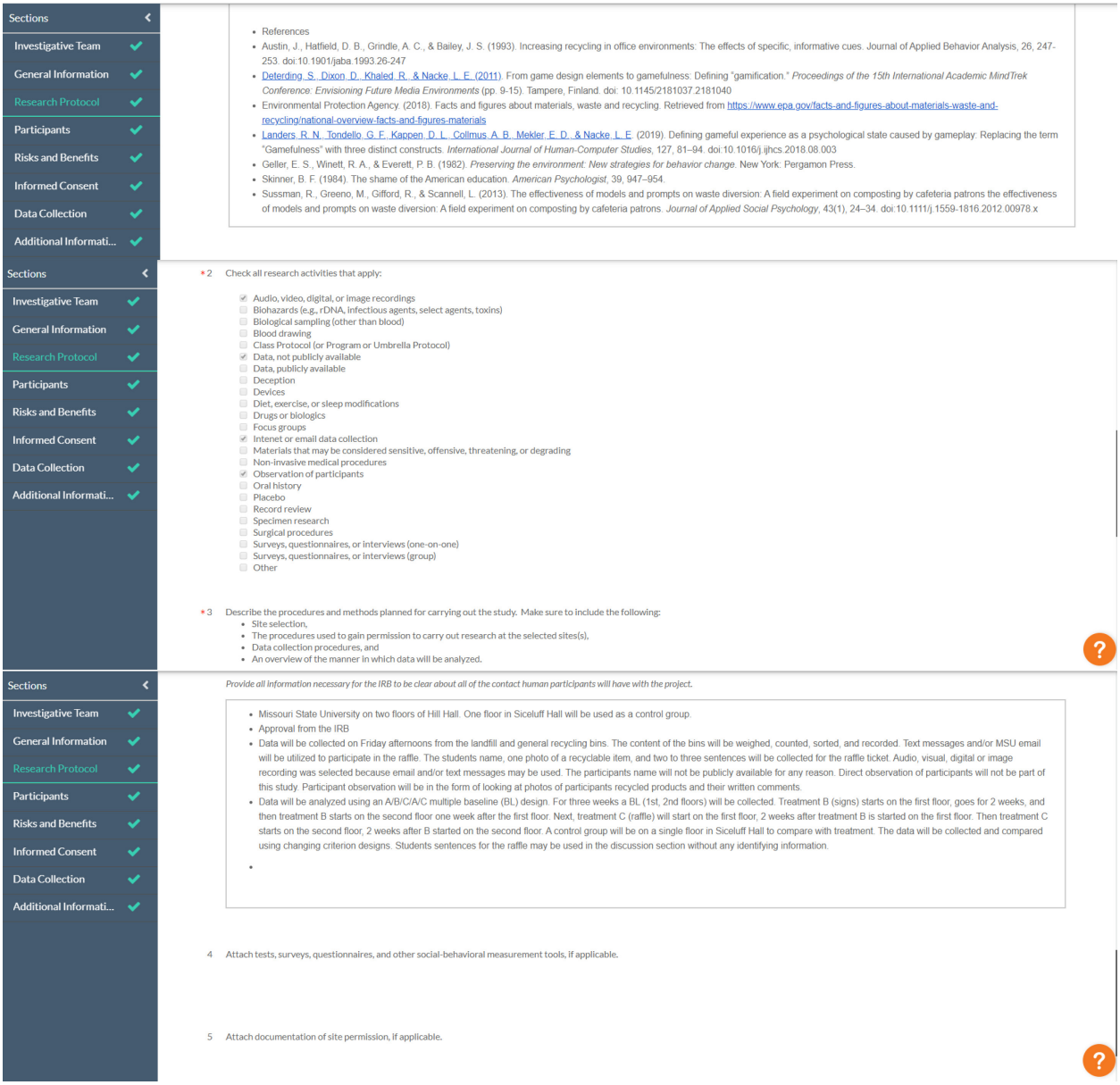
Research Protocol
*1 Describe the proposed project in a manner that allows the IRB to gain a sense of the project including:
The research questions and objectives,
Key background literature (supportive and contradictory) with references, and
The manner in which the proposed project will improve the understanding of the chosen topic.
Will visual prompts (signs) alone increase recycling behavior on two floors in Hill Hall? How will gamification in the form of a raffle increase recycling behaviors on the same two floors? The objective is to promote recycling behavior and decrease contamination in the recycling bins. A control group will be utilized from one floor in Siceluff Hall.
(Visual Prompts) Witmer and Geller (1976) conducted a study at Virginia Polytechnic Institute and State University in six dorm rooms to determine if visual prompts and a raffle would increase recycling behavior. Their findings suggested that signs unaccompanied by additional treatment variables was the least effective intervention method. On the contrary, Austin, Hatfield, Grindle, and Bailey (1993) examined the results of informative prompts to recycle, which provided supporting evidence that visual prompts did increase recycling. According to Sussman, Greeno, Gifford, and Scannell (2013) inexpensive signs increased composting behavior in the proper bins at a Canadian University.
(Gamification) Creating a raffle to increase recycling behavior will be used in this study. Deterding, Dixon, Khaled, and Nacke (2011) investigate to define the term gamification. The authors defined gamification as "The use of game design elements in non-game contexts" (p. 10). In ABC Gamification: Raffle for Recycling a non-game element, (e.g. recycling) will provide a participant with a raffle ticket (e.g. game). Skinner (1984) spoke about gamification before the word was introduced in 2010 (Deterding et al., 2011). Skinner states, "No one really cares whether Pac-Man gobbles up all those little spots on the screen…What is reinforcing is successful play, and in a well-designed instructional program, students gobble up their assignments" (p. 952). Contrarily, Landers, Tondello, Kappen, Collmus, Mekler, and Nacke (2019) provide evidence that if gamification does not include gamefulness than it is not successful in modifying behavior, The authors (2019) state, "From this view, any gamification interventions that do not successfully create gamefulness are by definition unsuccessful, or more broadly interpreted, perhaps even "not gamification" (p. 3). Currently, there is a lack of literature on gamification and its association with recycling. How the authors in the references define gamification is important to determine if the research is supportive or contradictory.
The manor of the project is to increase recycling behavior and decrease contamination in the bins. For 2015, the Environmental Protection Agency reported that 262.4 million tons of municipal solid waste were placed in US landfills, and out of this food (22%), plastic (18.9), and paper and paperboard (13.3%) were the top three materials documented (EPA, 2018). This research will help determine if evidence-based practices can improve participants recycling behavior.



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* 2 Check all research activities that apply:

- [x] Audio, video, digital, or image recordings
- [ ] Biohazards (e.g., rDNA, infectious agents, select agents, toxins)
- [ ] Biological sampling (other than blood)
- [ ] Blood drawing
- [ ] Class Protocol (or Program or Umbrella Protocol)
- [x] Data, not publicly available
- [ ] Data, publicly available
- [ ] Deception
- [ ] Devices
- [ ] Diet, exercise, or sleep modifications
- [ ] Drugs or biologics
- [ ] Focus groups
- [x] Intenet or email data collection
- [ ] Materials that may be considered sensitive, offensive, threatening, or degrading
- [ ] Non-invasive medical procedures
- [x] Observation of participants
- [ ] Oral history
- [ ] Placebo
- [ ] Record review
- [ ] Specimen research
- [ ] Surgical procedures
- [ ] Surveys, questionnaires, or interviews (one-on-one)
- [ ] Surveys, questionnaires, or interviews (group)
- [ ] Other

* 3 Describe the procedures and methods planned for carrying out the study. Make sure to include the following:
- Site selection,
- The procedures used to gain permission to carry out research at the selected sites(s),
- Data collection procedures, and
- An overview of the manner in which data will be analyzed.

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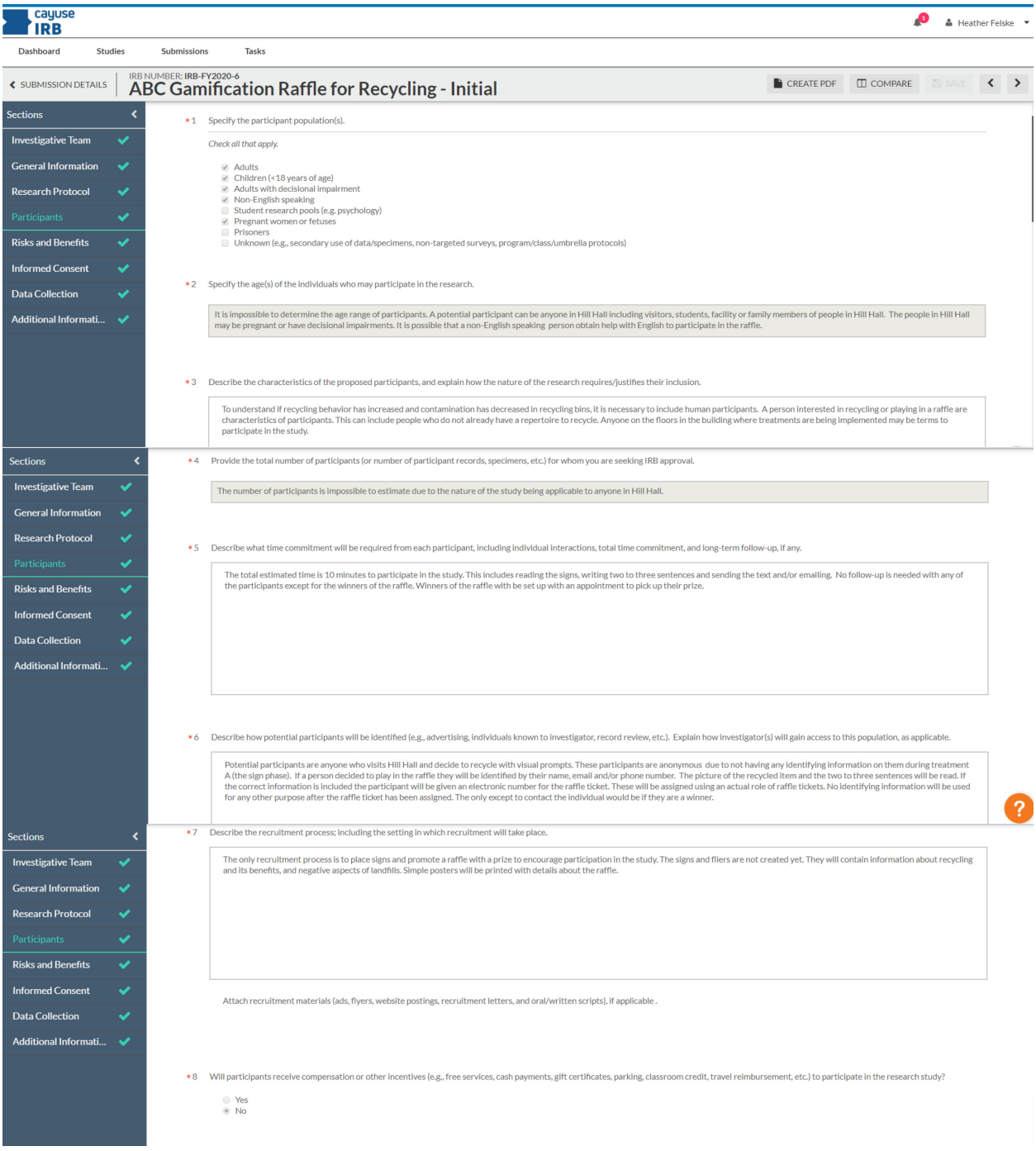
Provide all information necessary for the IRB to be clear about all of the contact human participants will have with the project.

- Missouri State University on two floors of Hill Hall. One floor in Siceluff Hall will be used as a control group.
- Approval from the IRB
- Data will be collected on Friday afternoons from the landfill and general recycling bins. The content of the bins will be weighed, counted, sorted, and recorded. Text messages and/or MSU email will be utilized to participate in the raffle. The students name, one photo of a recyclable item, and two to three sentences will be collected for the raffle ticket. Audio, visual, digital or image recording was selected because email and/or text messages may be used. The participants name will not be publicly available for any reason. Direct observation of participants will not be part of this study. Participant observation will be in the form of looking at photos of participants recycled products and their written comments.
- Data will be analyzed using an A/B/C/A/C multiple baseline (BL) design. For three weeks a BL (1st, 2nd floors) will be collected. Treatment B (signs) starts on the first floor, goes for 2 weeks, and then treatment B starts on the second floor one week after the first floor. Next, treatment C (raffle) will start on the first floor, 2 weeks after treatment B is started on the first floor. Then treatment C starts on the second floor, 2 weeks after B started on the second floor. A control group will be on a single floor in Siceluff Hall to compare with treatment. The data will be collected and compared using changing criterion designs. Students sentences for the raffle may be used in the discussion section without any identifying information.
-

4 Attach tests, surveys, questionnaires, and other social-behavioral measurement tools, if applicable.

5 Attach documentation of site permission, if applicable.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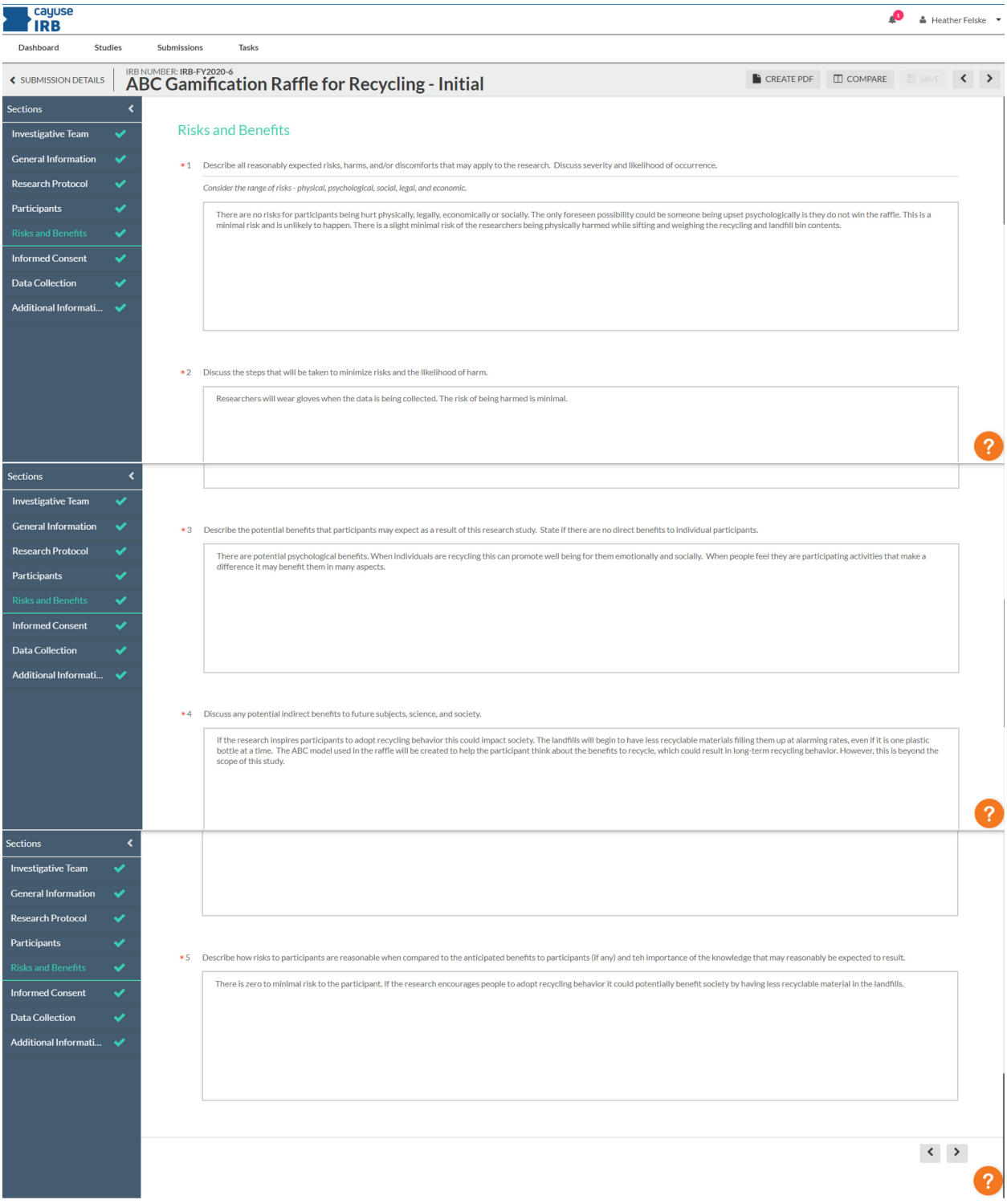
*1 Specify the participant population(s).
Check all that apply.
Adults
Children (<18 years of age)
Adults with decisional impairment
Non-English speaking
Student research pools (e.g. psychology)
Pregnant women or fetuses
Prisoners
Unknown (e.g., secondary use of data/specimens, non-targeted surveys, program/class/umbrella protocols)
*2 Specify the age(s) of the individuals who may participate in the research.
It is impossible to determine the age range of participants. A potential participant can be anyone in Hill Hall including visitors, students, facility or family members of people in Hill Hall. The people in Hill Hall may be pregnant or have decisional impairments. It is possible that a non-English speaking person obtain help with English to participate in the raffle.
*3 Describe the characteristics of the proposed participants, and explain how the nature of the research requires/justifies their inclusion.
To understand if recycling behavior has increased and contamination has decreased in recycling bins, it is necessary to include human participants. A person interested in recycling or playing in a raffle are characteristics of participants. This can include people who do not already have a repertoire to recycle. Anyone on the floors in the building where treatments are being implemented may be terms to participate in the study.
*4 Provide the total number of participants (or number of participant records, specimens, etc.) for whom you are seeking IRB approval.
The number of participants is impossible to estimate due to the nature of the study being applicable to anyone in Hill Hall.
*5 Describe what time commitment will be required from each participant, including individual interactions, total time commitment, and long-term follow-up, if any.
The total estimated time is 10 minutes to participate in the study. This includes reading the signs, writing two to three sentences and sending the text and/or emailing. No follow-up is needed with any of the participants except for the winners of the raffle. Winners of the raffle with be set up with an appointment to pick up their prize.
*6 Describe how potential participants will be identified (e.g., advertising, individuals known to investigator, record review, etc.). Explain how investigator(s) will gain access to this population, as applicable.
Potential participants are anyone who visits Hill Hall and decide to recycle with visual prompts. These participants are anonymous due to not having any identifying information on them during treatment A (the sign phase). If a person decided to play in the raffle they will be identified by their name, email and/or phone number. The picture of the recycled item and the two to three sentences will be read. If the correct information is included the participant will be given an electronic number for the raffle ticket. These will be assigned using an actual role of raffle tickets. No identifying information will be used for any other purpose after the raffle ticket has been assigned. The only except to contact the individual would be if they are a winner.
*7 Describe the recruitment process; including the setting in which recruitment will take place.
The only recruitment process is to place signs and promote a raffle with a prize to encourage participation in the study. The signs and fliers are not created yet. They will contain information about recycling and its benefits, and negative aspects of landfills. Simple posters will be printed with details about the raffle.
Attach recruitment materials (ads, flyers, website postings, recruitment letters, and oral/written scripts), if applicable .
*8 Will participants receive compensation or other incentives (e.g., free services, cash payments, gift certificates, parking, classroom credit, travel reimbursement, etc.) to participate in the research study?
Yes
No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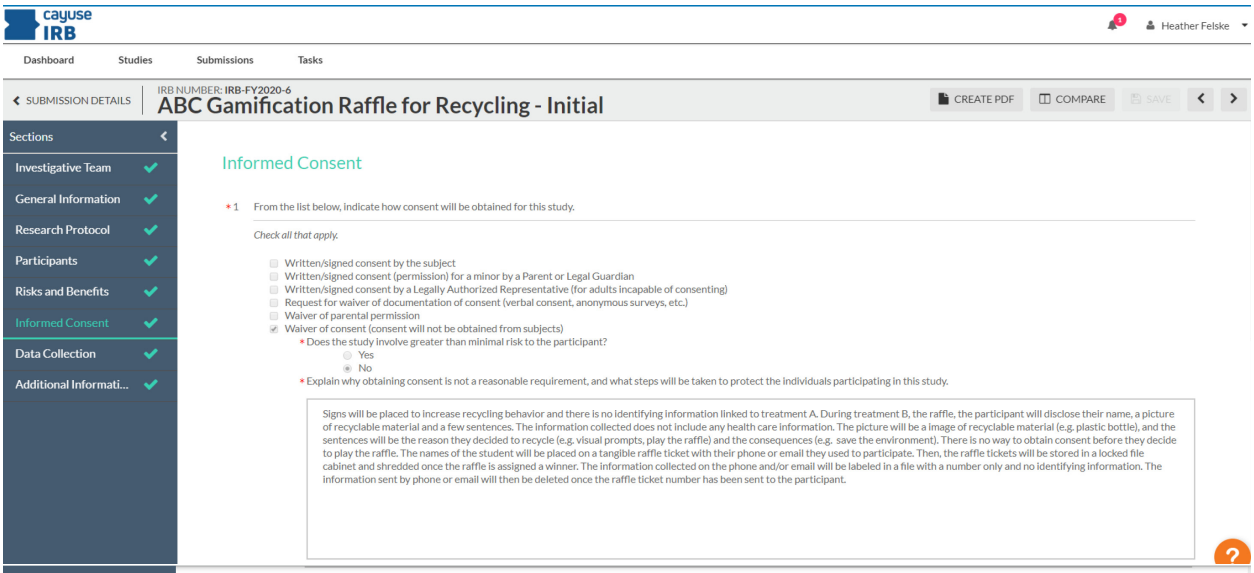
Risks and Benefits
*1 Describe all reasonably expected risks, harms, and/or discomforts that may apply to the research. Discuss severity and likelihood of occurrence.
Consider the range of risks - physical, psychological, social, legal, and economic.
There are no risks for participants being hurt physically, legally, economically or socially. The only foreseen possibility could be someone being upset psychologically is they do not win the raffle. This is a minimal risk and is unlikely to happen. There is a slight minimal risk of the researchers being physically harmed while sifting and weighing the recycling and landfill bin contents.
*2 Discuss the steps that will be taken to minimize risks and the likelihood of harm.
Researchers will wear gloves when the data is being collected. The risk of being harmed is minimal.
*3 Describe the potential benefits that participants may expect as a result of this research study. State if there are no direct benefits to individual participants.
There are potential psychological benefits. When individuals are recycling this can promote well being for them emotionally and socially. When people feel they are participating activities that make a difference it may benefit them in many aspects.
*4 Discuss any potential indirect benefits to future subjects, science, and society.
If the research inspires participants to adopt recycling behavior this could impact society. The landfills will begin to have less recyclable materials filling them up at alarming rates, even if it is one plastic bottle at a time. The ABC model used in the raffle will be created to help the participant think about the benefits to recycle, which could result in long-term recycling behavior. However, this is beyond the scope of this study.
*5 Describe how risks to participants are reasonable when compared to the anticipated benefits to participants (if any) and teh importance of the knowledge that may reasonably be expected to result.
There is zero to minimal risk to the participant. If the research encourages people to adopt recycling behavior it could potentially benefit society by having less recyclable material in the landfills.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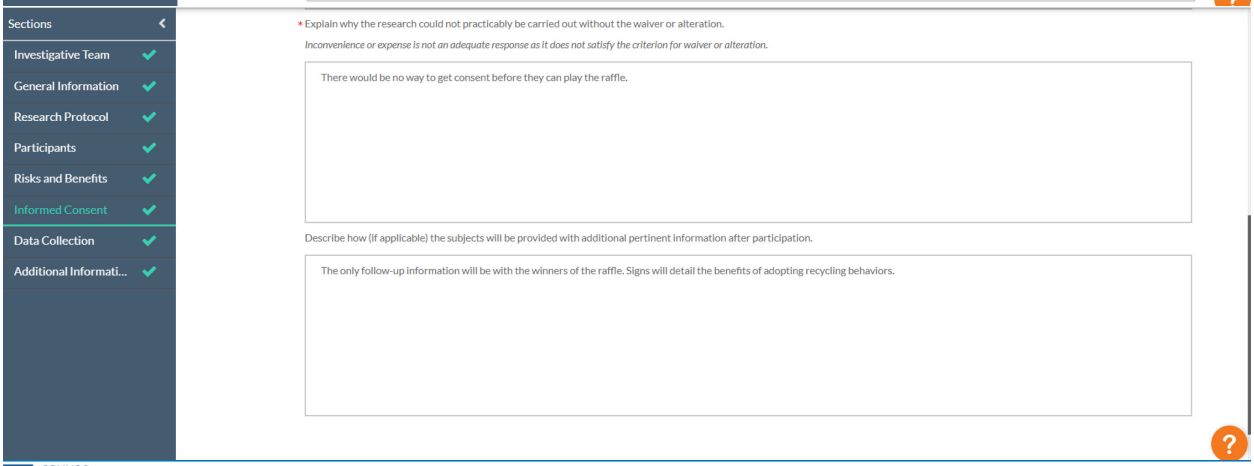
Informed Consent
* 1 From the list below, indicate how consent will be obtained for this study.
Check all that apply.
Written/signed consent by the subject
Written/signed consent (permission) for a minor by a Parent or Legal Guardian
Written/signed consent by a Legally Authorized Representative (for adults incapable of consenting)
Request for waiver of documentation of consent (verbal consent, anonymous surveys, etc.)
Waiver of parental permission
Waiver of consent (consent will not be obtained from subjects)
* Does the study involve greater than minimal risk to the participant?
Yes
No
* Explain why obtaining consent is not a reasonable requirement, and what steps will be taken to protect the individuals participating in this study.
Signs will be placed to increase recycling behavior and there is no identifying information linked to treatment A. During treatment B, the raffle, the participant will disclose their name, a picture of recyclable material and a few sentences. The information collected does not include any health care information. The picture will be a image of recyclable material (e.g. plastic bottle), and the sentences will be the reason they decided to recycle (e.g. visual prompts, play the raffle) and the consequences (e.g. save the environment). There is no way to obtain consent before they decide to play the raffle. The names of the student will be placed on a tangible raffle ticket with their phone or email they used to participate. Then, the raffle tickets will be stored in a locked file cabinet and shredded once the raffle is assigned a winner. The information collected on the phone and/or email will be labeled in a file with a number only and no identifying information. The information sent by phone or email will then be deleted once the raffle ticket number has been sent to the participant.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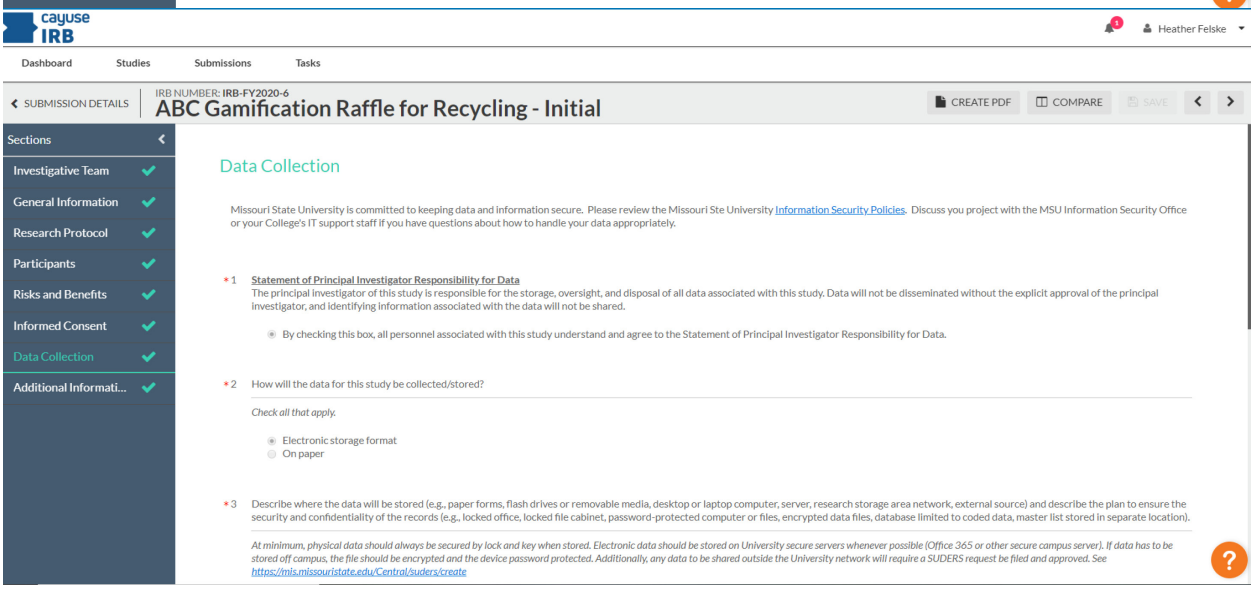
* Explain why the research could not practicably be carried out without the waiver or alteration.
Inconvenience or expense is not an adequate response as it does not satisfy the criterion for waiver or alteration.
There would be no way to get consent before they can play the raffle.
Describe how (if applicable) the subjects will be provided with additional pertinent information after participation.
The only follow-up information will be with the winners of the raffle. Signs will detail the benefits of adopting recycling behaviors.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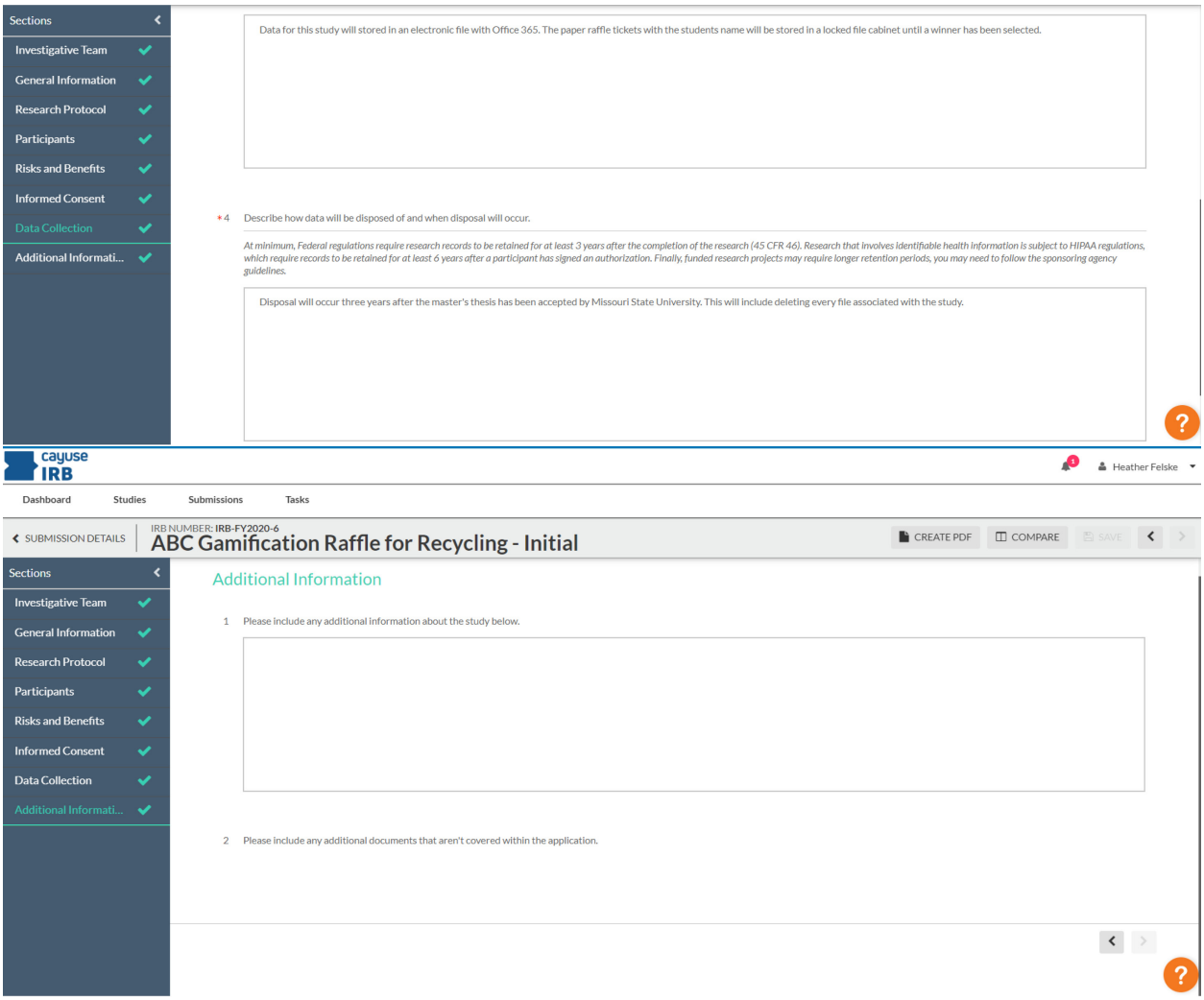
Data Collection
Missouri State University is committed to keeping data and information secure. Please review the Missouri Ste University Information Security Policies. Discuss you project with the MSU Information Security Office or your College's IT support staff if you have questions about how to handle your data appropriately.
* 1 Statement of Principal Investigator Responsibility for Data
The principal investigator of this study is responsible for the storage, oversight, and disposal of all data associated with this study. Data will not be disseminated without the explicit approval of the principal investigator, and identifying information associated with the data will not be shared.
By checking this box, all personnel associated with this study understand and agree to the Statement of Principal Investigator Responsibility for Data.
* 2 How will the data for this study be collected/stored?
Check all that apply.
Electronic storage format
On paper
* 3 Describe where the data will be stored (e.g., paper forms, flash drives or removable media, desktop or laptop computer, server, research storage area network, external source) and describe the plan to ensure the security and confidentiality of the records (e.g., locked office, locked file cabinet, password-protected computer or files, encrypted data files, database limited to coded data, master list stored in separate location).
At minimum, physical data should always be secured by lock and key when stored. Electronic data should be stored on University secure servers whenever possible (Office 365 or other secure campus server). If data has to be stored off campus, the file should be encrypted and the device password protected. Additionally, any data to be shared outside the University network will require a SUDERS request be filed and approved. See https://mis.missouristate.edu/Central/suders/create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Data for this study will stored in an electronic file with Office 365. The paper raffle tickets with the students name will be stored in a locked file cabinet until a winner has been selected.
* 4 Describe how data will be disposed of and when disposal will occur.
At minimum, Federal regulations require research records to be retained for at least 3 years after the completion of the research (45 CFR 46). Research that involves identifiable health information is subject to HIPAA regulations, which require records to be retained for at least 6 years after a participant has signed an authorization. Finally, funded research projects may require longer retention periods, you may need to follow the sponsoring agency guidelines.
Disposal will occur three years after the master's thesis has been accepted by Missouri State University. This will include deleting every file associated with the study.
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Additional Information
1 Please include any additional information about the study below.
2 Please include any additional documents that aren't covered within the application.