Floating Toward Sustainability: A UWinnipeg Campus Perspective

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Contents

1. Purpose

The purpose of this project is to develop a report that successfully informs the reader about floating and its relevance to social sustainability at the University of Winnipeg. In addition, the report will provide information regarding the feasibility of a float centre situated on campus. The information provided will lay a foundation for future decisions regarding a float centre at the University of Winnipeg.

2. Objectives

There are two main objectives this report attempts to meet,

1. The development of a rationale, which successfully demonstrates the relevance of floating to social sustainability at the University of Winnipeg.
2. The development of a feasibility study, which provides information and analysis for issues relating to the introduction of a float centre on campus.

3. Methods

A variety of sources were used in the construction of this report, including: scientific research papers, internet sources, and books. In addition, expert information from the owners of Float.Calm is included.

4. Terms

Sensory deprivation tank, float tank, float pod, and isolation tank are all interchangeable. The most common name used in research and industry is float tank and this is the primary term used for the purpose in this report.

Flotation REST, floating, and flotation therapy are all interchangeable. The most common term used in research is flotation REST and the most common name used in industry is floating. Both of these terms will be used in this report.

5. Background

The float tank is a lightless, soundproof structure, inside which an individual floats in Epsom salt saturated water heated to body temperature. The function of the tank is to deprive the participant of sensory perceptions, in order to create an environment of minimal stimulation. Floating offers many therapeutic benefits, both physical and mental.

Figure 1. (befreefloating.com, 2013)

In a typical flotation REST session, a participant would enter the float tank and lay in a

supine position, with the Epsom salt saturated water acting as support for the body. Due to the density of the salt water it takes a conscious effort to turn over, ensuring the safety of each participant. Participants typically spend forty-five to ninety minutes in the float tank per session, which gives them ample time to relax and heal.

In terms of operation there is nothing that needs to be done while a participant is in the float tank. An associate must be available in case of an emergency, but the float session itself is a very simple process. There are procedures related to sanitation that must be followed in between participants, but this will be discussed in further detail later in the report.

5.1 History

Original research regarding sensory deprivation began in the 1950s, but it was not conducted in a modern style float tank. Sensory deprivation was achieved through isolation in a waterless chamber or through a technique which required the participant to wear a mask while submerged in water. While these techniques were successful in achieving sensory deprivation they were ultimately inconsistent and generally stressful for participants.

In 1977, sensory deprivation research changed when John C. Lilly invented the Samadhi float tank. Lilly had been involved in early research in sensory deprivation and his design proved to be much more user friendly in comparison to previous techniques. This form of sensory deprivation is better known as flotation REST (Restricted Environmental Stimulation Technique), which is the accepted technique in modern research.

There was a boom in the floating world after the design of the Samadhi tank in 1977. Many studies were conducted during the 80s and float centres began to pop up all over the United States, stimulating the industry. Unfortunately, the 90s were not as kind to the world of floating. It is speculated that the AIDS epidemic played a major role in the commercial downturn, and, in extension, the efforts in research.

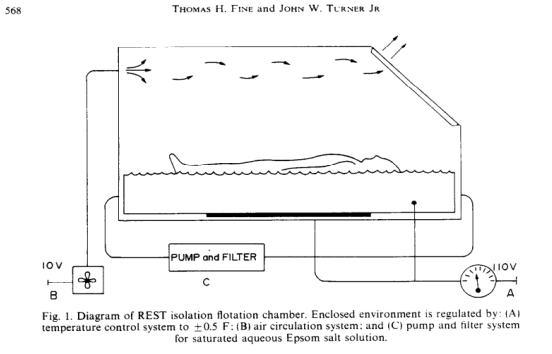


Fig. 1. Diagram of REST isolation flotation chamber. Enclosed environment is regulated by: (A) temperature control system to ±0.5 F; (B) air circulation system; and (C) pump and filter system for saturated aqueous Epsom salt solution.

Figure 2. (Turner & Fine, 1983)

The 2000s brought a renewed optimism as research in flotation REST became prominent once again, with new research coming out of Sweden. In addition to the increase in research there was a rebound in the industry as well, with new float centres opening their doors. Currently there are over two hundred and fifty commercial float centres in the United States and over 45 in Canada (Floatation Locations, 2016). In 2010 the first float summit was held in London, England and in 2012 the first annual float conference was held in Portland, Oregon. Flotation REST research continues to improve, with the introduction of a float lab equipped with an fMRI machine at the University of Tulsa (Oaklander, 2016).

5.2 Types of Float Tanks

There are many different float tank manufacturers around the globe, each offering a different aesthetic when it comes to the design of the tank. However, these tanks are all manufactured to perform the same function, so there are specific aspects that are consistent across designs. All float tanks come with a filtration system, which allows the tank to function without a plumbing hook up. The water is cycled through the filtration system a minimum of four times (this is industry standard) between each floater. The filtration systems can operate under a standard electrical current; however they do need special electrical fittings to function properly. A heater also comes with each design to ensure the water stays at body temperature. Float tanks often come with a speaker system as well to allow for music or recordings (this is typically an option). Additionally, each float tank can be disassembled and moved if necessary. Some different float tank designs include: the Samadhi Float Tank, Oasis Float Tank, and i-sopod. There are also Float Cabins and Float Rooms which will not be discussed (but pictures will be included).

The Samadhi design is a 44" wide x 94" long x 44.5" high structure (4' x 8'), made out of double walled ABS (thermoplastic polymer). The space needed for housing the tank is dependent on the positioning of the filtration system, as it is separate from the float tank unit (see Appendix A). The Samadhi tank uses a heater in the ceiling of the tank to prevent condensation from dripping and also includes a light on the interior. This tank comes with an air circulation system as well.

Figure 3. (pearltrees.com, 2011)

Figure 4. (oasisrelaxation.com, 2014)

The Oasis float tank is very similar in aesthetic when compared to the Samadhi tank; however, they differ in a couple of ways. Firstly, the Oasis float tank is slightly larger than the Samadhi tank measuring 56" wide x 99" long x 45" high. Another 6" to 36" inches of space is needed to house the filtration system (putting it behind the tank would be more efficient in terms of space). An 8' x 9' space (filtration system on the side) or a 5' x 11' space (filtration system behind) is needed for sufficient housing. The Oasis float tank is made out of single walled fiberglass and comes with a UV light (Samadhi does not) as an additional sanitation procedure. Instead of a heater installed in the ceiling, the ceiling itself is sloped to prevent condensation from dripping. This design does not come with a built in light or air circulation system, however it is ventilated.

Figure 5. (blessthisstuff.com)

The i-sopod design is larger and more pleasing aesthetically than both the Samadhi and Oasis design. It is a 60" wide x 101" long x 51" high structure, needing roughly a 6' x 9' space for sufficient housing. It is made out of double skinned glass reinforced plastic and comes with a UV light (similar to Oasis). It is also equipped with a mechanical ventilation system. Condensation is avoided due to its design (sloped top). One advantage of the i-sopod design is that it houses the filtration system in the back of the tank, rather than outside of the structure, which eliminates extra planning in terms of space. It also is bigger on the interior than the other two designs and comes with a light on the inside (similar to Samadhi).

Float cabins and float rooms are more spacious versions of the float tank. These designs may be more comfortable for individuals who are very claustrophobic or intimidated by the smaller space of the float tank; however there is no difference in the overall experience.

Figure 6 (above). Float Cabin (floatspa.hu)

Figure 7 (left). Float Room (wheretofloat.com)

6. Results

6.1 Rationale

6.1.1 Sustainability Related Benefits

Flotation REST has been researched extensively since the invention of the Samadhi float tank in 1977. Results from the research suggest that there are many positive outcomes associated with flotation REST, including: relaxation and stress reduction, enhanced well-being, enhanced athletic performance/recovery, meditative states, and pain management. These specific benefits will be discussed in the context of sustainability at the University of Winnipeg. Additional benefits include enhanced learning, enhanced creativity, and magnesium absorption through the Epsom salt.

Relaxation and Stress Reduction

According to Ben-Menachem (1977) (as cited in Bood et al., 2006) two conditions must be present to elicit a relaxation response, including: reduced sensory input and reduced bodily movements (pg. 155). As flotation REST began to be recognized as a legitimate relaxation technique, research was conducted on the overall effectiveness of the technique in terms of inducing relaxation on participants.

Jacobs et al. conducted a study in 1984, which compared the effects of flotation REST and the effects of a normal sensory environment on relaxation levels of participants. The experimental and control groups shared the same relaxation program (ten 45 minutes sessions, breathing techniques, visual imagery techniques etc.) and went through the same pre and post session testing (electromyogram, galvanic skin response, peripheral skin temperature, and blood pressure). The post-test included a subjective questionnaire. Two important results came from this study.

Firstly, participants in the experimental group reported greater relaxation when responding to the subjective relaxation questionnaire. According to Jacobs et al., "the experimental group reported greater relaxation on three of the five questions and similar trends on the remaining two" (1984, pg. 106). In addition, participants from the experimental group reported relaxation as a benefit of the experience more than twice as often as members of the control group (Jacobs et al., 1984, pg. 107). These findings suggest that flotation REST induces more subjective relaxation than normal sensory environments.

Secondly, participants in the experimental group recorded a higher reduction in blood pressure across sessions (Jacobs et al., 1984, pg. 106). This gives some physiological evidence to back up the subjective results.

Overall, the study done by Jacobs et al. suggests that the environment created by the float tank is more conducive to relaxation than a normal sensory environment. It is only logical to suggest that some of this relaxation is induced because of the extra relief the float tank creates from everyday chronic stressors (smartphones, artificial lighting etc.). The nervous system is allowed to experience a higher quality break from normal stressors in the float tank compared to a normal sensory environment.

In addition, a study conducted by Turner and Fine (1983) associated flotation REST with significant decreases in plasma cortisol (plasma cortisol is a laboratory test used to determine cortisol levels in the blood). The study was similar in method when compared with Jacobs et al., as the control group and flotation REST group were trained in the same relaxation techniques. They found that the participants in the flotation REST condition experienced a more significant decrease in plasma cortisol from pre to post session. For example, the REST assisted group experience a 20.3 percent drop in plasma cortisol in session 5, while the control group only experienced a 7.3 percent drop (Turner & Fine, 1983, pg. 119). It was also noted that there was a more significant decrease in plasma cortisol across sessions for the REST assisted group. (Turner & Fine, 1983, pg. 120).

The physiological improvements noted in these studies (decrease in cortisol and blood pressure) along with the subjective results collected from participants, offers evidence that flotation REST is not only a legitimate relaxation and stress reduction technique, but a high quality technique as well.

Enhanced Well-Being

Western society has experienced an increase in awareness of negative and often debilitating effects of anxiety and depression during the 21st century. Methods to alleviate individuals from their suffering when dealing with these particular illnesses are evolving and expanding. Results from research in the field of flotation REST suggests that the float tank is not only a viable method to alleviate symptoms in individuals with these conditions, but it can also enhance other aspects of an individual's well-being (eg. sleep quality and optimism).

A study conducted by Bood et al. (2006) found results which supported the idea that flotation therapy can be a useful method to enhance different areas of well-being. Seventy participants suffering from stress related pain were randomly split into a control group and a flotation REST group (twenty-six participants also had burnout depression). The flotation REST group came for forty-five minutes of floatation therapy, twice a week, for six weeks (twelve sessions in total). The control group received the same amount of treatment; however they were only permitted to sit in a comfortable armchair and read magazines.

Prior to the execution of the study, the researchers interviewed the participants. Part of the interview process was to gauge the level of anxiety and depression the participants were experiencing using the Hospital Anxiety Depression scale (HAD). Other relevant measures used were the Life Orientation Test (measure of dispositional optimism), and a questionnaire, which measured for a variety of variables including sleep quality (Bood et al., 2006). A follow up study was conducted four months after treatment concluded to determine the long-term effects of the therapy.

The study yielded significant results, including an improvement among participants in the flotation REST group in all four relevant areas (anxiety, depression, dispositional optimism, and sleep quality). The data showed a drop in anxiety from 8.41 to 6.11 (27 percent) directly after treatment, increasing only slightly to 6.96 four months after treatment (Bood et al., 2006, pg. 169). Depression showed a decrease from 6.06 to 4.14 (24 percent) directly after treatment, increasing to 4.32 four months after treatment (Bood et al., 2006, pg.169). The researchers also noted that depression levels were affected more positively by the participants suffering from burn out depression, stating specifically:

> "patients who did not have a burnout diagnosis first decreased their levels of depression directly after treatment and then increased again 4 months after treatment back to the original level, whereas the patients with a burnout diagnosis lowered their depression levels, according to a trend test (5% level), both directly after treatment and 4 months after the treatment." (Bood et al, 2006, pg. 169)

Sleep quality increased from 43.71 to 54.03 (23 percent) directly after treatment and decreased slightly to 52.21 four months after treatment (Bood et al., 2006, pg 168). Dispositional optimism increased from 19.26 to 20.85 (8 percent) directly after treatment and increased to 21.25 four months after treatment (Bood et al, 2006, pg. 168).

The results from this study show that flotation REST has a positive impact on well-being during a treatment period, but it also demonstrates that the positive effects extend beyond the treatment period. This suggests that flotation therapy can not only have an immediate effect on well-being, but a lasting effect as well.

Interestingly, Bood et al. conducted a follow up study, in which they wanted to determine if thirty-three sessions would be more effective than twelve (2007). According to Bood et al., "the results indicated no, or small, differences between the two programs in regard to treatment effects" (2007, pg.154). These findings point toward the idea that there is a ceiling on a flotation treatment program in terms of the degree of the treatment effects. Less may be just as effective as more.

Aslenof et al. built on the results of the aforementioned studies in 2007 by combining flotation REST therapy with psychotherapy. They wanted to see if improvements to an individual's overall well-being would improve more drastically with the combination of the two methods, rather than just an increase in float sessions.

Two women age 55 and 58 participated in the study, which lasted one year. The two participants were both on long term sick leave from their respective jobs. One participant suffered from burn-out depression, while the other dealt with fibromyalgia. According to Aslenof et al. both women had tried other methods including, "psychotherapy, relaxation techniques, medicine, easier physical training programs, acupuncture, and so on" (2007, pg. 261). Unfortunately none of these techniques were helpful in terms of improving their conditions.

Each participant worked through the same program, which included: thirty-five sessions of flotation REST therapy (forty-five minutes each), group therapy on eight occasions, conversational therapy on eight occasions, and picture therapy on eight occasions (Aslenof et al., 2007, pg. 261). The group, conversation, and picture therapy sessions were coordinated together, with each session including forty-five minutes of flotation REST therapy. The remaining float sessions were decided on by the participants, under the condition that they would participate in these sessions at least once every other week. Additionally, two interviews were conducted: one halfway through the program and the other at the conclusion of the program. According to Aslenof et al. four main themes emerged during the course of the study, including: the therapeutic work model, the transformation of emotions, self-awareness, and meaning of life (2007, pg. 263).

The work model consisted of the group, conversation, and picture therapy in combination with flotation REST. The relationship between the work model and the remaining themes is expressed in figure one:

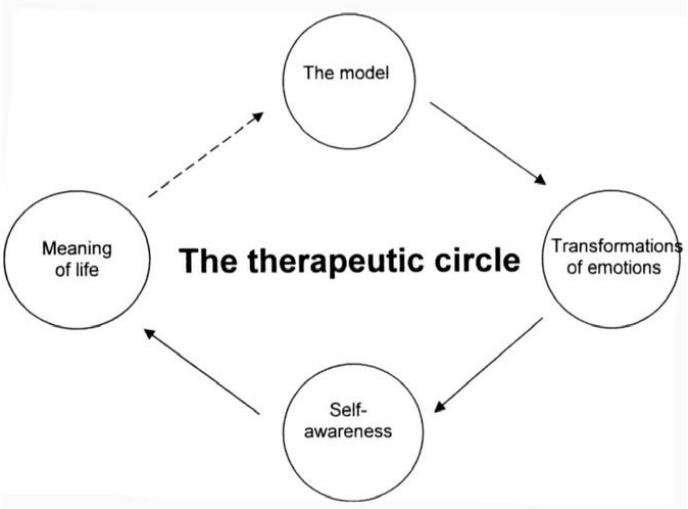


Figure 8. (Aslenof et al., 2007)

An excerpt from the study does a good job of explaining the role of flotation REST within the therapeutic work model:

> After a demanding therapeutic conversation, the client had the opportunity to go through what had taken place during the conversational therapy in a relaxed state in the flotation tank. Observations frequently reoccurred in both the interviews and the journals that "insight into the conversational therapy becomes clearer when you lie in the flotation tank." The flotation tank was a safe place where the clients perceived that fear and anxiety disappeared, a condition which was characterized by trust and belief in the future. The clients came into close contact with themselves, both mentally and physically. Feelings and thoughts emerged in powerful descriptive pictures which opened new perspectives and attitudes. (Aslenof et al., 2007, pg. 263)

The effect of the float tank on the mental and physical was also discussed in the context of the work model:

> Another observation which can be made in connection with the work model is that the link between the mental and the physical is reinforced. The salt water, which produced a sense of weightlessness and freedom, and the silence increase the feeling of really being in one's body. The clients hear their pulse and become aware of every part of their body. Breathing becomes a major instrument for keeping one's balance. Pain emerges first and then slowly diminishes. An interaction between body and soul is initiated and results in physical and mental healing (Aslenof, 2007, pg. 264).

The second theme that emerged during the course of the study was the transformation of feelings. Both participants felt feelings of fear, which caused them worry and anxiety (pg. 265). The work model was a powerful tool to transform these feelings, which was explained thusly:

> The conversational therapy was the first step for the clients toward dealing with an unpleasant feeling that had caused worry and anxiety over a long period. The safety and calm of the flotation tank made it possible to confront these unpleasant feelings and also to put a face to them, to dare to look at them. Painting pictures after the flotation helped to improve self-insight and provide an opportunity to step outside the difficulties and choose a better alternative. The journal writing was a further help in reflecting on the process (Aslenof et al., 2007, pg. 265).

The third theme that emerged during the course of the study was self-insight. The participants experienced a higher level of self-insight and much of this was attributed to the time spent in the float tank. Relaxation in the float tank allowed each participant to increase bodily awareness and break ingrained patterns of thinking (Aslenof et al., 2007, pg. 266). The float tank (with the support of the other aspects of the work model) seems to have given the participants a place where their physical and mental pain became more objective and less threatening. It was commented by one participant that," I am safe in the flotation tank from all evil. It feels like going into safety and closing the door" (Aslenof et al., 2007, pg. 265).

The final theme that emerged during the course of the study was meaning. The work model was effective in giving the participants a new meaning to their illness. According to Aslenof et al. the participants recorded that," the illness has given them greater respect and understanding for other people and has changed their relations to those closest to them" (2007, pg. 267).

Overall this program was very successful, thanks in part to flotation REST. After eighteen months a follow up was conducted. The participants were off sick leave and at jobs they found meaningful. According to Aslenof et al. the participants were doing much better with their physical and mental ailments as well:

> Their daily anxiety had gone, temperature changes in their bodies were less frequent, and their various aches and pains had disappeared or had been dramatically reduced at the same time as they had stopped taking medication. One of the clients observed that she had difficulty in remembering how ill she had been and therefore she sometimes took out her journal just to remind herself how difficult life had been (2007, pg. 270).

The research shows that flotation REST can be a great help to individuals looking to improve on their overall well-being. A powerful aspect of flotation REST method is that it can help a wide range of individuals, from people looking to get a better nights rest to individuals suffering from major mental and physical illnesses.

Athletic Performance/Recovery

A small improvement in a particular skill can make all the difference for athletes looking to become the best in their chosen sport. Flotation REST provides an environment which is conducive to fine tuning skills developed by athletes, helping them push beyond their perceived ceiling. In addition, flotation REST can aid in the recovery process, giving an athlete an edge between contests.

Suedfeld and Bruno (1990) conducted an experiment, which was designed to test the effect of flotation REST and imagery on foul shooting ability. Thirty university students were split evenly into three different treatment groups including: flotation REST, alpha chair (special relaxation chair), and control (armchair). All students chosen for the study played basketball occasionally or not at all. The study was conducted over three days: day one for pretests, day two for treatment, and day three for post testing. On day two the participants listened to a tape recording guiding them through multisensory imagery of basketball foul shooting in their treatment environment.

The results of this study showed significant differences only on the post test. According to Suedfeld and Bruno, "the REST group (M=11.5) made significantly more baskets than either the alphas (M=7) or the controls (M=6.7)" (1990, pg. 84). Additionally, the pre- to post-test changes were +37% (flotation REST), +13% (alpha), and -11% (control) (Suedfeld & Bruno, 1990, pg. 84).

Wagman et al. (1990) conducted a study that looked at the effect of flotation REST on high level college basketball players (Division one). Twenty-two students were split into two separate conditions: alpha chair (normal relaxation method) and flotation REST. Participants in both conditions were exposed to imagery training while in their respective treatment environments. The study was conducted over a three week period, with each athlete exposed to six treatment sessions.

PERF scores were used to measure the performance of the athletes in both conditions. These scores are derived from a formula, which awards positive points (eg. successful passing or shooting) or negative points (eg. fouling or travelling) (Wagman et al., 1991, pg. 120). PERF scores were collected 11 games prior to study, during the study and five games after completion.

The results showed that the REST group scored significantly higher on performance (M=15.8) than the alpha chair group (M=11.2) (Wagman et al., 1991, pg. 121). In addition, the researchers found a significant improvement in performance when a participant experienced two REST sessions (M=26.0) between games as opposed to one (M=15.8) (Wagman et al., 1991, pg. 121).

McAleney et al. (1990) looked at the effect of flotation REST in the context of tennis performance. Twenty students participated in the study (ten men and ten women), all from PAC-10 colleges. The method of this study was very similar to the study conducted by Wagman et al in 1991.

The results showed a significant difference in first service results in the post treatment. The REST group had a mean result of 2.55 first service winners, whereas the control group showed a mean score of 0.67 (McAleney et al, 1990, pg. 1027).

In addition to enhanced performance, flotation REST has a positive effect on the recovery process. Morgan et al. (2013) conducted a study, which attempted to uncover the effect of flotation REST on knee extension and flexion, blood lactate, heart rate, perceived

exertion and perceived pain (pg. 5). The researchers employed a typical flotation REST study, using a REST and non-REST group to compare results. The results were derived from strenuous knee extension and flexion exercises. The data showed that flotation REST lowered blood lactate twenty-five percent compared to the control condition (Morgan et al., 2013, pg. 14). In addition, the research found that participants felt less perceived pain in the flotation REST condition (Morgan et al., 2013, pg. 16).

Meditative States

Meditative states are characterized by certain types of brain wave activity, specifically alpha and theta state brainwaves. Alpha waves are between 8-12 Hz and are often associated with feelings of relaxation and calmness. Theta waves are between 4-7 Hz and are associated with a drowsy, dreamlike state. According to Hutchison (1984, pg. 53) humans generate theta waves, "at least twice per day: in those fleeting instants when we drift from conscious drowsiness into sleep, and again when we rise from sleep to consciousness as we awaken".

Research suggests that the environment created by the float tank is helpful in terms of inducing alpha and theta state brainwaves. For example, a study done by Taylor (1990) looked at the effect flotation REST had on learning using EEG measurements. The study was conducted using a typical flotation REST method (REST and non-REST conditions). In addition to results related to learning, Taylor also found that the flotation REST condition induced low frequency waves more often than the non-REST condition (Taylor, 1990, pg. 131). Zubek (as cited in Hutchison, 1984, pg. 56) found similar results in his research "EEG changes in perceptual and sensory deprivation" reporting that theta waves became more prominent.

Flotation REST has also been known to induce altered states of consciousness in some participants. Kjellgren et al. (2008, pg. 652) conducted a study which recorded different experiences related to altered states. Some examples include: "visual imagery, acoustic, perceptual phenomena, an altered sense of time, a changed bodily sense, perinatal experiences of the fetal stage and birth, and even transpersonal experiences".

Pain Management

Injuries that cause chronic pain are typically treated with drugs, physiotherapy, massage therapy, acupuncture, hydrotherapy, or cognitive behaviour therapy (Edebol et al., 2008, pg.481). While drugs are considered to be the most effective option in terms of pain alleviation, many come with harmful side effects that cause the individual separate health issues. Alternative therapies are less harmful to other functions of the body; however they are also less effective in terms of managing the pain. Research suggests that flotation REST is an effective pain management method; although it is not entirely clear why it works.

Edebol et al. (2008) conducted a study, which focused on the short term effects of flotation REST on individuals suffering from chronic whiplash associated disorder (WAD). Seven individuals participated in the study, which required them to float at least once a week for forty-five minutes.

The results from this study are primarily experiential; however accounts from multiple participants demonstrate the effectiveness of the flotation REST method for managing this particular condition. One participant remarked:

> I feel like I have become better. I haven't read much about this, I have mostly tried it and I walk around telling everybody, "If you are in pain, go and lie down, it is so nice, it is completely wonderful." I think it has become much better after this, I don't feel the pain as much as before (Edebol et al., 2008, pg. 485).

A case study was reported by Rogan et al. in 2001, which looked at the effect of flotation REST and spinal manipulation on lower back pain. A twenty-six year old female was the subject for this study. The participant was pain free after four weeks of treatment and remained pain free after a three month follow-up (Rogan et al., 2001, pg. 29).

According to Edebol et al. (2008) flotation REST is comparatively more effective than other alternatives in terms of managing chronic injuries from a holistic standpoint. The ability of the float tank to successfully manage the physiological pain associated with chronic injuries, as well as mental/emotional pain makes it an interesting alternative to drugs and other methods.

6.1.2 Relevance to Current Social Sustainability Initiatives

Considering that the float tank is a relatively new and novel technique for achieving improved human health and wellness, there must be concrete connections made between floating and current social sustainability initiatives offered on campus. These connections (supported by the research) make the value of floating clearer in the context of campus life at the University of Winnipeg.

The University of Winnipeg already offers a variety of services and initiatives related to human health and wellness, including: stress management initiatives (exam therapy dogs, reading week), a wellness centre (which includes counselling services and a Klinic), an athletics department, and mindfulness meditation sessions. Floating can serve as a support for, or an extension of, the services already available to students on campus.

Firstly, floating could help alleviate general student stress. Students often suffer from high stress levels while at university, specifically around exam time. Often times it is hard to take a high quality break from the chronic stressors that accompany student life, especially with the increasing reliance on technology. A float tank could be used as an additional stress management tool to help students lower their stress levels and ultimately help them achieve their academic goals.

Floating has proven to make a difference in the overall well-being of individuals suffering from anxiety and depression, specifically with repeated exposure. Floating as an alternative healing method for mental illness could be an asset to the staff in counselling services. Our mental health professionals could potentially refer or recommend students to experience a session in the float tank, as something to aid with their illness. Positive outcomes from floating could potentially enhance subsequent sessions with the staff in counselling

services, to help aid these students more effectively. In contrast, floating could also be used as a self-help tool for individuals less comfortable with counselling.

There are advantages to floating from an athletic perspective as well. Wesmen athletes would be the primary beneficiaries of the float tank from this perspective, due to their high level of skill and frequency of exercise. However, any individual who participates in some form of exercise can take advantage of the environment the float tank creates to keep their body fresh, relaxed, and ready to perform.

Floating as a meditative aid has also proven to be effective. The minimal stimulation created by the float tank allows for a level of stillness that may be more difficult for some to reach in a normal sensory environment. Access to a float tank could help individuals deepen their meditative practice while on campus, contributing to their overall well-being. In addition, floating for the purpose of meditation would be a good extension of the mindfulness meditation sessions already offered on campus.

The float tank as a pain management tool could also be an extension of the services offered by the campus clinic. As more results become available in this particular area of flotation REST research, staff in the clinic could use the float tank as an option for individuals suffering from injury related pain. In addition, the float tank could be used as a self-help tool for individuals who are interested in, or, who are already comfortable with this method of pain management.

6.1.3 Other Benefits

Enhanced learning, enhanced creativity, and magnesium absorption are all documented in the literature as benefits associated with flotation REST. Samples of research results found in the literature in these particular areas are shared below.

Enhanced Learning

Taylor (1990) looked at the effect of flotation REST on learning. The researchers recruited 109 female undergraduate students, aged 18-22, all of whom were enrolled in a second year chemistry class. These 109 students were then put through a pre-testing phase, with the forty students with the highest scores chosen for the remainder of the study. The students were then split evenly into the REST and non-REST conditions. All forty students went through the same pre-learning process. Students would be asked a series of questions relating to chemistry in a Faraday cage, while hooked up to an EEG machine. After completion of the pre-learning process, students would be brought to their learning environment (REST or non-REST). Both environments played a recording of the questions asked in the pre-learning condition, giving each subject the opportunity to reflect on the correct answers to each question. The participants were then taken back to the Faraday room for the post-learning testing.

Taylor (1990, pg. 132) came to two significant conclusions. Firstly, he found that, “The total amount of learning per subject was greater among the floating group than among the

non-floating control group". Additionally, he found that the degree of learning in the flotation REST condition was higher compared to the non-REST condition when the difficulty of the question was greater.

Enhanced Creativity

A study done by Suedfeld et al. (1987) tested the effect of flotation REST on scientific creativity. Seven full time faculty members at the University of British Columbia participated in the study. Each faculty member was instructed to generate ideas related to their work in two different environments, including: OFFICE (personal office) and flotation REST. Data analysis was based on four sessions in each of the two environments.

The main hypothesis of this study was supported: new ideas generated during REST were rated as more creative than those originating in OFFICE sessions (Suedfeld et al., 1987, pg. 226).

Magnesium Absorption

The Epsom salts used in the float tank are a great source of magnesium, which is an essential component of the body.

Magnesium:

- Is an important factor in muscle relaxation and heart health
- Allows nerves to send messages in the brain and nervous system
- Aids and regulates the body's use of calcium and other minerals
- Assists in bone and teeth formation
- Regulates the metabolism of nutrients such as protein, nucleic acids, fats and carbohydrates
- Regulates cholesterol production and helps modulate insulin sensitivity
- Assists in energy production, DNA transcription and protein synthesis
- Maintains the structural health of cell membranes throughout the body

(Enviromedica, 2015)

6.2 Feasibility

6.2.1 Sanitation

The filtration system that is included with the float tank is the primary method of keeping the Epsom salt saturated water clean, but it is also highly recommended that a UV light be used as an additional measure. Manitoba Health has laid out specific guidelines regarding water chemistry and bacterial sampling as well (see Appendix B).

6.2.2 Space and Location

The amount of space needed for a float room is dependent on the type of tank purchased, the positioning of the filtration system (see Appendix A), and the space allocated for the shower. A shower is not a mandatory feature of a float room; however, the owners of Float.Calm highly recommend that a shower be located in the same room due to the corrosiveness of the Epsom salt solution.

Estimates were calculated for each of the three float tanks discussed prior (Samadhi, Oasis, and i-sopod). Space is allocated for the float tank, filtration system (if necessary), and shower. The most spacious option is considered for each estimate. Additional space for changing clothes is also taken into account.

1. Samadhi
    a. Tank = 29 sq ft
    b. Filtration system = 8 sq ft
    c. Shower = 16 sq ft
    d. Change space = 60 sq ft
    e. Total = 113 sq ft
2. Oasis
    a. Tank = 39 sq ft
    b. Filtration system = 8 sq ft
    c. Shower = 16 sq ft
    d. Change space = 68 sq ft
    e. Total = 131 sq ft
3. i-sopod
    a. Tank = 42 sq ft
    b. Shower = 16 sq ft
    c. Change space = 74 sq ft
    d. Total = 133 sq ft

The ideal location for a float centre on campus is in the Duckworth building, and in fact at present there is empty space there that is very promising (1D10). There are three specific reasons why this location is highly suitable.

Firstly, it is currently not in use for the purpose of teaching classes or otherwise. Acquiring space on campus to house the float tank(s) is one of the most challenging issues relating to the overall feasibility of the project, so this is an important space to keep in mind.

Secondly, 1D10 is located a few feet away from the Duckworth reception area. Regardless of location, staff will be needed to maintain the tanks and also take care of bookings. The reception desk makes this location a huge asset providing it is feasible for the staff at the reception desk to take care of these duties.

Lastly, 1D10 is located on the same floor as the new campus wellness centre. It would be an added perk to have a float centre located close to the wellness centre, as they complement one another.

Other requirements related to facility construction can be found in Appendix B.

6.2.3 Cost

Cost List

1. Initial costs
    a. Construction (plumbing, flooring, soundproofing etc.)
    b. Tanks
        i. Samadhi - $11,000-$14,950 USD plus shipping (price depends on package)
        ii. Oasis - $10,810 USD plus shipping (typical order according to their website)
        iii. i-sopod - $25,000-$30,000 USD plus shipping
    c. Epsom salts
    d. Bromine
    e. Water chemicals - muriatic acid or sodium bisulphate
    f. Water testing supplies
    g. Towels
2. Running costs
    a. Epsom salts (replace every six months or 1000 floats)
    b. Electricity/chemicals - $30-$40 USD weekly according to i-sopod (confirmed as a valid estimate by Float.Calm)
    c. Water
    d. Laundry
    e. Water testing supplies

Cost Estimate

This estimate is for one room, using the Oasis float tank. All prices are converted to Canadian dollars (1 USD = .76 CDN).

1. Initial costs
    a. Construction - $100-$200 per sq ft (estimate from Float.Calm)
    b. Tank - $14,086 plus shipping
    c. Epsom salts - $711.67 plus shipping for 1050 pounds
    d. Bromine - $106.99 for 7kg
    e. Muriatic acid - $12.99 for 4 litres
    f. ph testing kit - $9.99
    g. Towels - towel service on campus

    Total = $27,508-$40,008 plus shipping

2. Running costs
    a. Electricity/Chemicals - $157.56-$210.12 monthly
    b. Laundry - $75 monthly
    c. Epsom salts - $711.67 plus shipping every 6 months or 1000 floats
    d. ph testing kit - $9.99 x 2 = 19.98 monthly

    Total = $3,742.15-$4,372.87 annually plus shipping

6.3 Feasible Next Steps

An important next step of the UWinnipeg float tank project is a student, faculty, and staff engagement process, which would help determine the demand and/or willingness to pay for this type of service on campus. A pilot questionnaire has been constructed to get the ball rolling in this regard (see Appendix C).

Another relevant next step is to consider other potential locations for a float centre on campus and to analyze the costs/benefits associated with these spaces. Additional work could be done to further analyze the costs/benefits of each different type of float tank to give a more comprehensive idea of the strengths and weaknesses of each model. In extension, more work could be put into estimating costs for a float room using each type of float tank. A recommendation based on this analysis could be made to make a purchase decision an easier process when/if the time comes.

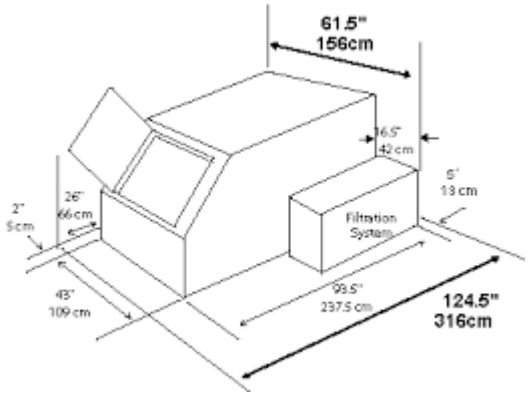
Important updates in the area of research should also be reported when necessary.

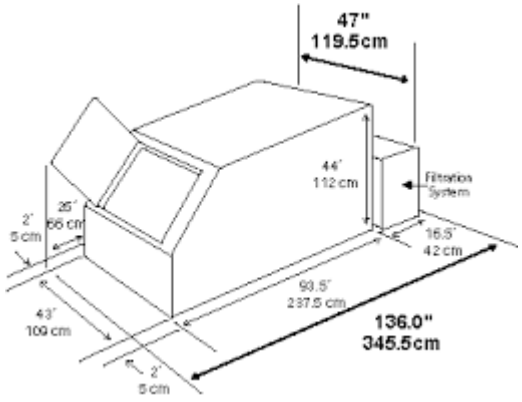
6.4 Concluding Comments

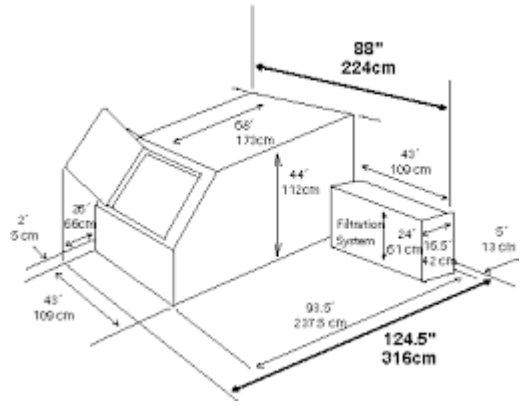
The first time I tried floating I was in awe of how beneficial the experience was to my own physical and mental well-being. I originally tried it in December of 2015 during an extremely chaotic period in my life, one of those periods where your world seems to be falling apart faster than you can put it back together. That first experience shifted my perspective in such a positive manner that I had to learn more about the experience. Luckily, I stumbled upon a unique opportunity to learn much more than I envisioned in our Campus Sustainability class. This class allowed me to pursue a passion of mine and also apply what I was learning to an institution I have been apart of for five years. I was able to learn a lot about the potential of the float tank in the context of our campus, which I found exciting and rewarding.

Although there will be many challenges associated with the introduction of a float centre at the University of Winnipeg, this project is a great first step in terms of understanding how much value it would add to our campus. It seems like a natural fit as it supports multiple dimensions of social sustainability, while the product itself functions in a sustainable manner. I am so grateful to have had this opportunity and I am hopeful the float tank project will extend into the future!

Appendix A







(Samadhi Tank Co Inc., 2014)

Appendix B

Manitoba
Health

Health Protection Unit
5th Floor, 408 Booth Drive
Winnipeg MB Canada R3J 3R7
T 204-945-4204 F 204-948-3727
www.manitoba.ca

Flotation Tank (Sensory Deprivation Tank) Checklist

Facility Construction

- ☐ Flooring is constructed of seamless, non-slip, smooth, impervious and durable material
- ☐ Floor material is coved 10 cm (4 inches) up the wall and sealed.
- ☐ Adequate drainage in the floor (with appropriate slope)
- ☐ All wall and ceiling surfaces are smooth, non-absorbent, non-porous, and easily cleanable.
- ☐ Ground fault circuit interrupters present for all electrical outlets.
- ☐ Janitorial sink in facility
- ☐ Adequate ventilation installed in accordance with the *Manitoba Building Code*.
- ☐ Showers equipped with liquid soap and shampoo for client use
- ☐ Washroom(s) provided equipped with toilet, hand sink with running hot and cold water, liquid hand soap, paper towels, and garbage bin.
- ☐ First Aid Kit containing articles listed in Schedule B of the *Swimming Pools and Other Water Recreational Facilities Regulation (MR 132/97).* ***Spine board not required for Flotation Tanks***
- ☐ Readily accessible telephone
- ☐ Lighting system that will maintain, at any point on the deck and the pool water surface, an illumination of not less than 200 lx
- ☐ Instantaneous automatic emergency lighting source to facilitate prompt evacuation in case of a power outage.
- ☐ No smoking signs are displayed clearly
- ☐ Signs posted in a conspicuous location instructing clients to use washroom facilities and to take a shower with soap and shampoo prior to entering float tanks.

Float Tank Construction

- ☐ All tank surfaces within the flotation tank basin are non-slip, easily cleanable, non-absorbent, non-porous, mould resistant material
- ☐ Stairs leading into and out of the float tank are non-slip and well marked
- ☐ Handrails are that are securely fastened and corrosion resistant are supplied for stairs that consist of 3 risers or more
- ☐ Stairs are non-slip and well marked
- ☐ Cross-connection control devices installed in accordance with Manitoba Plumbing Code.
- ☐ Tank shall be equipped with bottom drain, connected to the sanitary sewer through a backflow prevention device to allow complete draining for cleaning and disinfecting.
- ☐ Placement of tank inlet and outlet are located to provide effective circulation and skimming when the recirculation system is in operation.
- ☐ Recirculation system is capable of automatic filtration and disinfection when the recirculation system is in operation.
- ☐ Adequate air intake and exhaust vent in tank

☐ Emergency egress from float tank possible
☐ Sufficient clearance for emergency access (1.3 m arc from the point of entry)
☐ Automatic high temperature limit cut off switch that limits the maximum water temperature to 40ºC that is not accessible to clients.

Water Chemistry

☐ Water chemistry test kit(s) (i.e. pool test kits) onsite Type _____
☐ Thermometer(s) available
☐ Water tested frequently for the following:

☐ Free Chlorine Level (3 ppm – 5 ppm) ☐ Combined Chlorine Level (< 1.5 ppm)	☐ Total Bromine Level (2 ppm – 6 ppm)
☐ pH Level (7.2 – 7.8)	
☐ Supplementary Disinfection Type _____	
☐ Total Coliform (< 1 CFU/100 ml)	☐ Pseudomonas aeruginosa (< 1 CFU/100 ml)

☐ Frequency of water chemistry tested daily (prior to each client use, or every 2-3 hours)
☐ Frequency of bacterial sampling for **total coliform** and ***Pseudomonas aeruginosa*** (samples submitted to an accredited lab every 3 months for analysis)
☐ Log of daily record sheets kept up to date and onsite includes, but not limited to the following:
- Dates, times and results of all pH tests done,
- Dates, times and results of all tests done to measure disinfectant residual levels and combined chlorine residual levels,
- Dates, times and results of all bacterial analyses,
- Dates, times and results of any other tests that may be taken from time to time.
- Dates and times of chemical addition or maintenance completed
- Dates and times of fecal/urine incidents and actions taken to deal with the incidents
- Daily humidity readings in each room

☐ Recirculation system achieves 4 turnovers between each client.
☐ Recirculation system remains operational overnight and whenever clients are not utilizing the tank

Sanitation Plan

☐ Written Sanitation Plan in place
☐ Protocol in place for handling fecal/urine incident
☐ Floors, walls, counters and equipment are clean, sanitary and in good repair
☐ Interior surfaces of the floatation tank are disinfected with a low level disinfectant
☐ Soaps are single-use
☐ Facility is free of pests

Operational Requirements

☐ Facility is clean, tidy, and free of clutter
☐ Staff trained in the maintenance of equipment
☐ Staff trained in testing of the water (daily, frequency, in between clients)
☐ Written Operational Guideline in place and followed by staff which includes but is not limited to the following:
- Testing Water
- Cleaning & Maintaining Filters
- Maintaining Sanitation of the Flotation tank & Surrounding Area

☐ Staff trained to educate clients (written procedures should be available and/or posted)

Equipment

☐ Equipment has regular scheduled maintenance (if applicable)
☐ Filters are checked, maintained (cleaned) and replaced regularly, or as needed
☐ Equipment is approved for distribution and use in Canada
☐ Equipment is UL and/or NSF certified

Clientele Education

☐ Safety Procedures
- Emergency
- How to enter and exit
- Safety features
- Safety measures

☐ Personal Hygiene
- Requirement of the client to shower with soap and shampoo before (and after) the float session
- Exclude clients who are ill, have any skin diseases, infectious respiratory diseases, epilepsy, asthma, under the influence of substance, or have cause for concern for use of equipment

☐ Other
- Instructions on rinsing salt out of eyes

Documentation Kept Onsite (Reviewed by Staff Routinely)

☐ Sanitation Plan
☐ Operational Guideline
☐ Protocol in place for handling fecal/urine incident
☐ Safety Procedures – Emergency Response containing information including, but not limited to the information specified in Appendix C.1 of the *Swimming Pools and Other Water Recreational Facilities Regulation (MR 132/97).*
☐ Safety procedures – Clientele Education
☐ Personal Hygiene – Clientele Education
☐ Record Sheets for the following:
- ☐ Daily Water Chemistry Testing (prior to each client use, or every 4 hours)
- ☐ Scheduled Cleaning and Maintenance
- ☐ Fecal/Urine Incidents

☐ Other: _____

COMMENTS:

_____
_____
_____
_____

Appendix C

- Are you familiar with the function and benefits of a float tank? (Y/N)
    - If no, are you interested in learning more? (Y/N)
- Have you tried floating before? (Y/N)
    - If no, would you be interested? (Y/N)
    - If yes, would you do it again? (Y/N)
    - If you have tried or are interested in floating, what is or what would be your primary motivation?
        - Relaxation/stress reduction
        - Enhanced well-being
        - Athletic performance/recovery
        - Meditation
        - Other:
- If cost was not an issue, how many times a month would you float?
    - 1-2
    - 3-4
    - 5-6
    - 7+
- How much would you be willing to pay for a monthly float membership?
    - $1-$20
    - $21-$40
    - $41-$60
    - $61+
    - I wouldn't pay for a monthly float membership
- How many times a month would you float with a monthly membership?
    - 1-2
    - 3-4
    - 5-6
    - 7+
    - I wouldn't pay for a monthly float membership
- How much would you be willing to pay per float on campus?
    - $1-$10
    - $11-$20
    - $21-$30
    - $31-$40
    - $41+
    - I wouldn't pay for a float
- How many times a month would you float at your chosen willingness to pay option?
    - 1-2
    - 3-4
    - 5-6
    - 7+
    - I wouldn't pay for a float

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