Bringing Adventure-Based Therapy to Adolescent Cancer Patients: Design principles for interior oncology environments

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Abstract
Adolescence (ages 13-18) is a time of dynamic development in a young person's life, and can be profoundly affected with long-term consequences when confronted prematurely with mortality, due to the diagnoses and treatment of cancer. Adventure-based therapy (ABT), which uses outdoor leisure activities with an element of risk, has been shown to have a positive impact on the physical, psychological, and psychosocial side effects incurred by adolescent cancer survivors. This qualitative study focuses on enhancing the quality of life for adolescents undergoing treatment for cancer by integrating ABT into pediatric oncology environments. The research resulted in four design principles for implementing ABT into interior oncology environments.

Key Words
Adventure-based therapy, adolescent, oncology, late effects, quality of life

1. Introduction
Currently, 13,500 children under the age of 19 are diagnosed with cancer each year (People Against Childhood Cancer, 2011). With survival rates for childhood cancer reaching heights of 80%, St. Jude's Hospital has stated, “The vastly improved survival rates among pediatric cancer patients is one of the truly great success stories of modern medicine (St. Jude Children's Research Hospital, 2012)”. However, the increase in survival rates has not come without a cost. A new patient population of pediatric cancer survivors has emerged with life-threatening or life-altering medical complications due to the harsh treatments used to achieve survival (Creating Hope Act, 2011). Bleyer, 1990, pg. 10 states, “This dramatic progress is worthwhile only if the quality of survival—the medical, psychosocial, intellectual, emotional, and financial costs of cure—justifies the increased prolongation of life”. As survival rates increase, it becomes paramount to find cost-effective ways to mitigate the physical and psychological consequences related to the treatment of cancer for all children.

This qualitative study focuses on enhancing the quality of life for adolescents undergoing cancer treatment, and, ultimately, post-treatment, by studying the impact of integrating the ABT experience into pediatric oncology environments. First, a literature review of extant research on adolescent cancer survivors and ABT is provided. Next, findings generated from interviews conducted with recreational therapists are translated into design principles for integrating the ABT experience into the interior architecture of pediatric oncology environments. Finally, implementation of the design principles into a prototype will be discussed, along with implications for future research.

2. Literature Review

2.1 Adolescent Cancer Survivors
With 40,000 children ages 19 and under receiving treatment each year, “The average high school in the U.S. has two students who are current or former cancer patients” (People Against Childhood Cancer, 2011). Due to the lack of knowledge regarding the biology and etiology of cancers specific to the adolescent population, the unique sup-
Adolescents have experienced a lack of improved outcomes compared to other patient populations (National Cancer Institute, 2013). To improve outcomes for adolescents battling cancer, appropriate supportive care to meet the psychosocial needs of this patient population is needed.

2.1.1 Adolescence
Adolescence (ages 13–18) is a pivotal time in the development of an individual where a child transitions into adulthood through an increased involvement with peers, separation from parents, formation of sexual identity, development of a positive body image, and framing of future goals (D’Agostino, Penney, & Zebrack, 2011; Woodgate, 2005; Zebrack, Chesler, & Kaplan, 2010). Due to these rapidly expanding social, biological, and psychological changes, adolescence becomes a time of dynamic development in a young person’s life (Christie & Viner, 2005). This period of transition sets the foundation for adulthood through feelings of self-worth and development of personal identity (Palmer, Mitchell, Thompson, & Sexton, 2007). During this time of significant emotional, physical, and social change, a major impact on development occurs for adolescents who are confronted prematurely with mortality due to the diagnoses and treatment of cancer (Abrams, Hazen, & Penson, 2007; Zebrack et al., 2010).

2.1.2 Cancer diagnosis and treatment
A diagnosis of cancer elicits a primal response of fear from many adolescents, since they perceive cancer as synonymous with death (Abrams et al., 2007). Recent research suggests that adolescents respond and accept a diagnosis of cancer using patterns consistent with the developmental stage they are in, drawing upon social supports and a desire to quickly regain a normal life, to help foster a belief in recovery, and cope with the diagnosis (Abrams et al., 2007). A study by Stenga & Ward-Smith, 2009 suggests that peer and parent relationships, gaining information, getting used to the idea, loss of normalcy, and giving back are all part of the processing of a cancer diagnosis for an adolescent.

Depending on the stage of cancer and specific diagnosis, treatment for cancer in adolescents varies and can last for months or years (Erickson et al., 2012). Aggressive regimens consisting of chemotherapy, radiation, and surgery, often produce symptoms of pain, nausea, vomiting, extreme fatigue, hair loss, depression, and anxiety (Enskär, Carlsson, Golsäter, & Hamrin, 1997; Hockenberry, 2004). These intensive treatments induce changes in physical appearance, an increased dependence on parents, disruptions of social life and school, and health-related concerns about the future which challenge a young person during an already critical time of development in their life (Zebrack et al., 2010).

Treatment for cancer in adolescents is also complicated by the fact that people under the age of 18 are not considered adults in the legal sense of that word. While adolescents are able to cognitively understand the implications of diagnosis and treatment (Abrams et al., 2007), parents are responsible for the majority of medical decisions during this time in a young person’s life (Christie & Viner, 2005).

2.1.3 Late effects
Late effects can be termed as physical, psychological, or psychosocial side effects caused from enduring the harsh treatments needed to cure cancer (Barrera, Shaw, Speechley, Maunsell, & Pogany, 2005). Recent data show that “three out of five adolescents who survive cancer will suffer from life-altering or life-threatening late effects (Creating Hope Act, 2011).” Late effects include: organ damage, neuro-cognitive impairment, changes in physical appearance, additional malignancies, reduced growth, poor peer relations, fertility issues, anxiety, depression, and posttraumatic stress disorders (Jones, 2008; Jones, Parker-Raley, & Barczyk, 2011). These late effects can greatly impact the quality of life for adolescents during and after cancer treatment (Williamson, Harcourt, Halliwell, Frith, & Wallace, 2010).
Research suggests that an adolescent’s relationships with parents, teachers, coaches, and peers have the greatest impact on the psychosocial late effects of reduced self-esteem, increased self-consciousness, and social isolation (Vituillano, 2003; Williamson, Harcourt, Halliwell, Frith, & Wallace, 2010). These findings are supported through research conducted by Knapp, Quinn, Murphy, Brown, & Madden, 2010, which suggests peer interaction and support is the most influential in helping mitigate the psychosocial late effects regarding self-esteem and social isolation. They state, “Allowing adolescents with life-threatening illnesses to have interaction with peers may provide comfort and support that even parents and siblings cannot provide” (Knapp, Quinn, Murphy, Brown, & Madden, 2010). Loss of hope is another psychosocial late effect that can be greatly affected through positive peer relationships, which help foster the growth of personal competence and cognitive comfort (Cantrell & Conte, 2008).

### 2.1.4 Quality of life

Quality of life (QOL) for adolescents experiencing cancer can be defined as, “An overall sense of well-being based on being able to participate in usual activities, to interact with others and feel cared about, to cope with uncomfortable physical, emotional, and cognitive reactions, and to find meaning in the illness experience” (Hinds, 2010). Based on this definition, it is clear that QOL is a subjective experience that is unique for each adolescent undergoing treatment for cancer. Ultimately, QOL is an intensely personal phenomenon and one that can change throughout the cancer experience (Hinds, 1990).

Several instruments have been developed to measure the QOL for adolescents living the cancer experience. These instruments use various forms for reporting to assess QOL, such as: self-report, parent-report, and proxy-report (Varni et al., 1998; Ward-Smith, Hamlin, Bartholomew, & Stegenga, 2007; Wu et al., 2007). While each tool looks at several important areas related to QOL, it is difficult to have a complete understanding from one measure alone (Hinds, 1990). Due to this difficulty, QOL “should in all probability be assessed using more than one instrument, as well as including different perspectives from both proxy informants as well as from children themselves” (Bradley Eilertsen, Jozefiak, Rannestad, Indredavik, & Vik, 2012).

Research suggests that both resilience—the development and identification of strengths or resources to achieve positive results from a given experience—and hope have been shown to have a positive effect on an adolescent’s QOL during cancer (Cantrell & Conte, 2008; Nelson, Haase, Kupst, Clarke-Steffen, & Brace-O’Neill, 2004). A study by Bitsko Stern, Dillon, Russell, & Laver, 2008, found other predictors for an adolescent’s QOL in relation to cancer to be increased happiness and time perspective (the way an individual perceives their past, present, and future). The integration of the kinds of interventions referenced in the studies above could be a cost-effective method for enhancing the QOL for adolescents throughout the cancer experience (Bitsko, Stern, Dillon, Russell, & Laver, 2008).

### 2.2 Adventure Based Therapy

Adventure-based Therapy (ABT) has been referred to using many terms such as: adventure therapy, wilderness therapy, recreation therapy, outward bound, and adventure education, making it difficult to create a standard within the profession (Crisp, 1998). While each of these programs differs in regards to population, duration, professional and support personnel qualifications, and physical and social activities, ABT uses outdoor activities and situations with perceived risk and uncertain outcomes to engage participants. The participants must use their competencies to deal successfully with the challenge (Carlson & Cook, 2007).

In recent years, third party reimbursement has declined while the cost of ABT programs has risen, requiring parents with already limited funds or foundations to carry the burden for the cost for this intervention (Gass, Gil lis, & Russell, 2012). Because of this, few adolescents who survive cancer are actually able to participate in type of intervention.
2.2.1 Background
ABT in the United States can be traced back to the 1920’s when positive responses were noticed within psychiatric patients who were move outside into tents to help with overcrowding within facilities. The movement to treat patients outdoors transformed into adventure-based counseling in the 1930’s (Carlson & Cook, 2007). ABT is based upon many theoretic frameworks including: Gestalt practices, cognitive behavioral theory, Eco psychology, experiential learning theory, and reality therapy(Carlson & Cook, 2007; Gass et al., 2012). In 1986, Martin and Priest responded to an editorial attacking the problem of defining adventure education. In the paper, Martin and Priest used Michael Ellis’s Optimal Arousal Theory of Play and Mihaly Csikszentmihalyi’s “Flow” model depicting the balance between challenges and skills along with Colin Mortlock’s Four Stages of an Outdoor Journey to define the adventure experience paradigm (Martin & Priest, 1986). The adventure experience paradigm represents the relationship between risk and competence in relation to peak adventure, which they define as, “The point at which personal competence matches perfectly with situational risk, creating optimal arousal and resulting in maximum performance. It is the feeling of efficacy arising from a positive adventure experience (Martin & Priest, 1986).” This feeling of efficacy is paramount to building what Lerner refers to as the 5 C’s of positive youth development: confidence, connection, competence, character, and caring (Carpenter & Priest, 1989; Lerner, Almerigi, Theokas, & Lerner, 2005).
In 1989, Carpenter and Priest expanded on the adventure experience paradigm and its relation to non-outdoor leisure activities. They suggest ABT does not require an outdoor setting since the concept of adventure has to do with perceived risk in relation to perceived competency, and all leisure activities can become an adventure when uncertainty is present (Carpenter & Priest, 1989). While the majority of ABT is conducted in an outdoor environment, several attempts have been made to bring ropes courses, rock climbing, or other adventure activities into an interior environment where ABT is being administered (Gillis, 1985).

2.2.2 Transference
An essential aspect of the ABT experience is transference. Transference is, “The ability to transfer the lessons learned in the adventure experience into behavioral or attitudinal changes in their (the participants) everyday life (Elad, Yagil, Cohen, & Meller, 2003). Research by Stevens et al., 2004 suggests that transference helps to build self-esteem by allowing an individual to realize their own inner strength and capability to overcome an obstacle leading to personal empowerment. One participant in an ABT program for adolescent cancer survivors described transference this way, “While you are on chemo, you are tested in the same way adventure therapy tests you, only a little bit differently. Chemo tests you mentally, emotionally, physically, and adventure therapy does the same thing. And it feels really, really good when you climb that mountain- when you conquer something that seems impossible. In a sense, cancer’s the same way. When you beat it, that’s impossible. And I felt like a different person in the end (Caldwell, 2002).”

2.2.3 Applications
ABT has been used with multiple populations such families, at-risk youth, victims of abuse, trauma, and disease, college students, corporate employees, veterans suffering from PTSD, women, and athletes (Fletcher & Hinkle, 2002). Within the adolescent population, ABT has been used to help combat obesity (Jelalian, Mehlenbeck, Lloyd-Richardson, Birmaher, & Wing, 2006) depression (Riley, 2011) and rehabilitate juveniles within the justice system (Lowe, 2004) These studies indicate not only the broad spectrum in which ABT can be used, but also its ability to be effective within the adolescent population specifically.

2.2.4 Adventure-Based Therapy and Adolescent Cancer Survivors
Several survivorship programs for adolescents within the United States, Canada, and New Zealand have implemented ABT programs to help address the many late-effects associated with this patient population (Wynn, Frost,
While these programs have reported great success, ultimately, a very small number of adolescents who experience cancer ever participate in this type of intervention (McLaughlin et al., 2012). One factor contributing to a low participation rate is that these ABT programs focus primarily on survivors instead of those currently undergoing treatment. Due to the limitations imposed by the physical side effects incurred during treatment, it is almost impossible for adolescents to participate in an outdoor ABT program until treatment is complete. Chemotherapy can cause nausea and vomiting, pain, mucositis, nutritional depletion, loss of balance, extreme fatigue, and compromised immune functions; while radiation causes skin sensitivities, especially to the sun (Brown et al., 2003; Hockenberry, 2004). Another reason for low recruitment and participation in ABT and other interventions targeted to minimizing the psychosocial late effects within this population is the incompatibility and inaccessibility of this type of program in response to the lifestyle of this age group, which focuses on work, school, and family obligations (Elad et al., 2003).

For adolescent cancer survivors who are lucky enough to participate in such a program, ABT can facilitate enhanced self-discovery allowing the adolescent to feel empowered through self-realization, self-evaluation, self-exploration, self-acceptance, and self-reevaluation (Epstein, 2004). Among the documented programs, adolescents who have participated in ABT report increased self-esteem, which allowed them the confidence to reenter their social life (Daniels, 2002), and the development of valuable peer relationships (Caldwell, 2002). Research conducted by Stevens et al., 2004, reported four major themes based on an ABT expedition that took place in a remote area in Canada. The four major themes generated from that expedition were: rebuilding self-esteem, togetherness, creating memories, and developing connections, which reinforce the finding included in the previous studies (Stevens, et al., 2004).

3. Research Questions

RQ1: How does the adventure based therapy experience affect the recovery process for adolescent cancer survivors?

RQ2: How does the adventure based therapy experience impact quality of life in adolescent cancer survivors?

RQ3: How can the adventure therapy experience be integrated into the interior architecture of oncology environments for adolescents?

4. Research Design

This qualitative research was an ethnographic case study that utilized elements of grounded theory to understand the ABT experience for adolescent cancer survivors through the lens of the professional administering the intervention. The recreational therapists interviewed had conducted both winter and summer adventure-based therapy programs with adolescent cancer survivors who were involved in a survivorship program.

4.1 Participants

Two certified recreational therapists from U.S. Adaptive Recreation who use ABT programing with their clients were interviewed. The interviews were based upon their individual experiences with a group of cancer survivors. Over several years, U.S. Adaptive Recreation had worked with a non-profit organization called CoachArt who helped organize the ABT expeditions for adolescent cancer survivors from Children’s Hospital Los Angeles’s LIFE survivorship program. The LIFE survivorship sponsored two ABT excursions a year. A one-day ski trip to Big Bear Mountain was offered in the winter, and a two-day camping trip with watersports was offered in the summer at Big
Bear Lake. (This program has been suspended in recent years due to funding issues.) The institutional review board at Arizona State University approved all research activities pertaining to this study including recruitment and thematic content of interviews.

4.2 Method
Retroactive semi-structured interviews were conducted on February 7, 2013 in Big Bear Lake, California, with certified recreational therapists. The interviews took place at the ski resort where their winter ABT program is administered. The first interview took place during the morning therapy session and the second interview began during the afternoon session. A total of one hour and 43 minutes of interview was gathered. The interviews consisted of questions that pertained to three categories: the adventure therapy experience, the affect of adventure therapy on the recovery process, and the influence of adventure therapy on the cancer experience.

4.3 Analysis
Following data collection, interviews were transcribed using ExpressScribe. Once the interviews were transcribed, inductive reasoning was used to categorize information from each interview. Throughout the analytic process, these categories were merged and collapsed until overarching themes emerged, which reflected the data as a whole. From the data, four themes emerged that expressed the experience of adolescent cancer survivors who participated in this ABT program. For each of the four themes, a relationship developed conveying the adolescent’s internal response to the theme. Once the themes and relationships were established, data was again consulted to generate design principles, which would allow the application of the themes and relationships to be incorporated into an interior environment.

4.4 Results
The four major themes generated from this study were: Gaining control while loosing control, Pushing the limits here equals pushing the limits there, Special but not different, and Getting your life back only better. Within each theme a clear “yin-yang” relationship was evident; these relationships are defined by the physical, emotional, social, and spiritual aspects of an adolescent’s life, as described in the following section. It is within these relationships, singly or in combination, that transference takes pace. Design principles, each represented through two realms, were then distilled from the themes and relationships. A visual representation of each principle is included in section 5.

4.4.1 Theme 1: Gaining control while loosing control
The theme of Gaining control while loosing control has to do with the process of embarking on an activity the adolescent is unsure they can master. This insecurity requires the adolescent to acquire new skills, which are needed to accomplish the task given.

This theme is expressed through the relationship between risk and reward. As stated from one of the participants, “As risk goes up, it is the same as if the rewards go up.” It is through this process that adolescents build self-efficacy. See figure 1

![Figure 1: Illustration of risk and reward relationship](image-url)
One participant describes the process this way:

“That they have accomplished something that scared the hell out of them before, and what that does for any of us is tremendous.”

“So, now there’s self-efficacy—there’s self-accountability that they have and they are engaging. They’re making decisions based on what they’re being told to mitigate those risks, to minimize those. They are in control to a large degree. And that’s empowering.”

“They get back together as a group, which is great because they kind of share the war stories from the morning. They share the successes, or lack thereof, and frustrations. They just give each other grief, or whatever it might be.”

The principle that reflects this relationship of risk and reward is Engagement. Engagement is articulated through two realms: engagement with the environment (i.e., interactive interior architecture that contains an element of risk) and engagement with others (i.e., interior architecture that fosters peer relationships during a chosen intervention).

See figure 5

4.4.2 Theme 2: Pushing the limits here equals pushing the limits there
The theme of Pushing the limits here equals pushing the limits there refers to the building of self-confidence by going beyond perceived personal limitations. These limitations can be self-imposed or imposed by others. Once the adolescent perceives himself or herself as able to push the limits through an adventure, they become more self-confident about pushing the limits within other realms of their life.

This theme is expressed through the relationship between boundaries and freedom. When given the opportunity to push the limits appropriately and individual needs are taken into account, adolescents often feel a sense of freedom from the illness. See figure 2

Participants described the relationship of boundaries and freedom through these words:

“It depends on the student or the participant, who and what they really need. If they need that physical [challenge] because they are recovering from an amputation, then we’ll work on that. If they need to believe in themselves again—if it’s someone that needs that emotional [challenge]—we try really hard to hook them up with the right person.”

“We’re up there really encouraging them to push their limits and take it to whatever edge is appropriate for them. To make sure they are comfortable and that they feel secure and confident… capable, but at the same time, encouraging them to try what they may not think was possible.”
“Just for one day forget what you have. Forget what you’re dealing with, and come out and have a good time. Be a kid, be an adolescent, be a young adult, be whatever you need to be.”

The principle that reflects the relationship between boundaries and freedom is Personalization. Personalization is essential in two domains: personalization for needs (i.e., interior architecture that responds to an individual’s specific needs) and personalization for limitations (i.e., interior architecture that accommodates changing limitations throughout a specific intervention) See figure 6

4.4.3 Theme 3: Special but not different
The theme Special but not different refers to the need for adolescents who have undergone cancer to receive specialized attention to help mitigate the late effects incurred from cancer and its treatment. However, along with special attention in that realm of their life, they also need and want to be considered not different from their peers.

This theme is expressed through the relationship between exclusion and inclusion. Adolescents need the opportunity to rehabilitate in a way that makes them feel special during treatment, but allows them to feel capable of participating in every day life.

The participants described the process in these words:

“We can sort of build upon what they are gaining at school. It’s a complementary therapy—complementary to what they might be getting at school through an occupational therapist, through a physical therapist, whatever it might be.

“Our goal is ultimately to say, ‘Bye-bye’ to people, because we want them normalized to the degree that they no longer need our services.”

“We believe in inclusion. We’re all using the same facilities and we want to be out there on the hill not just to show our participants that they’re not different, or they’re as different as we all are, but to show the public that our participants aren’t actually different.”

“They can now go and do anything that their friends are doing. They can be a part of it. They can be everything. I think it plays a huge role in their recovery.”

The principle that reflects the connection between exclusion and inclusion is Integration. Integration must be actualized in two reams: integration into treatment (i.e., interior architecture which supports a chosen intervention during the treatment process) and integration into life (i.e., interior architecture which accommodates life’s rituals) See figure 7
4.4.4 Theme 4: Getting your life back only better

The theme Getting your life back only better refers to the process adolescents go through to synthesize the cancer experience. This alteration of perspective can be a powerful experience for both the adolescent and his or her family.

This theme is expressed through the relationship between loss and gain. While on one hand, adolescents who have experienced cancer can experience great loss in many areas of their life, they can also frame the experience in such a way that they are empowered to live their new life to its fullest. See figure 4

The participants expressed this dichotomy through these statements:

“You can’t just treat, treat, and treat. There’s life after cancer. There’s life after the hospital. This is what it’s all about. This is where the treatment continues.”

“You know, getting them away from those green walls on the silver blue water. It is a big difference.”

“We have given them some tools to just expand their lives. In terms of intrinsic rewards, creating that independence. Giving them not just that sense of accomplishment, but encouragement to go fly now.”

“It’s a lot of self-building. It’s a lot of self-confidence. It’s bringing that intrinsic motivation back out of them. That gives them a little more confidence in their life and in their world, and that improves their quality of life.”

The principle that reflects the relationship of loss and gain is Evaluation. Evaluation can be executed within two dimensions: evaluation of progress (i.e., interior architecture that reflects the progress made from a chosen intervention) and evaluation of transference (i.e., interior architecture that fosters the opportunity for reflection). See figure 8

5: Implications

The principles generated from this research have the potential to enhance the quality of life for adolescents who are undergoing treatment for cancer. The psychosocial benefits of ABT during the treatment phase can greatly enhance the adolescent patient experience through a rediscovery of self and empowerment over the cancer experience. The design principles have the potential to shape the creation of design interventions at multiple scales, and provide a platform from which other alternative therapies such as music, light, and art may be administered.

6: Prototype

A prototype was developed as a means of visually representing one possible strategy for applying the above design principles to an interior architecture environment for oncology settings where adolescents are receiving cancer treat-
ment. It should be noted that these design principles could be implemented at various scales. The prototype shown here is one application of the design principles at a scale that allows for their implementation in an existing space, requiring no structural changes to the interior of a healthcare facility.

The key feature of this prototype is an immersive environment utilizing virtual reality and a video game. Recent research suggests that virtual reality can help with pain management during chemotherapy and cancer-related procedures (Sander Wint, Eshelman, Steele, & Guzzetta, 2002; Schneider & Hood, 2007), and video games have the potential to improve health outcomes, especially in the areas of physical and psychological therapy (Cole, Yoo, & Knutson, 2012; Kato, Cole, Bradlyn, & Pollock, August 2008; Primack et al., 2012), when used as a distraction technique.

Each design principle is represented in various features of the prototype, as described below:

**Engagement:**
An immersive, interactive environment using a mix of virtual reality and video game elements

![Figure 5: Prototype configuration illustrating Engagement. (Rendering by Tim Norris)](image)
Personalization:
Choice of various adventure scenarios and seating configurations, as well as storage for personal belongings.

Figure 6: Prototype configuration illustrating Personalization. (Rendering by Tim Norris)
Integration:
The ability to administer treatment while patient is engaged in ABT, storage for nursing supplies, and an IV pole dock

Figure 7: Prototype configuration illustrating Integration. (Rendering by Tim Norris)
Evaluation:
Performance feedback through LED lights, opportunity for patient to reflect on adventure scenarios, and feedback from the video game

Figure 8: Prototype configuration illustrating Evaluation. (Rendering by Tim Norris)

7: Limitations
While this study adds theoretical and practical applications for enhancing the quality of life for adolescents undergoing treatment for cancer, it does have some limitations. First, a small number of recreational therapists participated in this study. This is due to the fact that the ABT program offered through the LIFE survivorship program in conjunction with Children’s Hospital Los Angeles has not been in operation for three years due to limited funding. Because of the lapse in time since the program has been in effect, two recreational therapists remained who had worked with the adolescent cancer survivors from the LIFE survivorship program. In addition, only the therapist’s perspective was considered in the present study. A complete understanding of the ABT experience would be gained by adding the perspective of the adolescents themselves as well as caregivers. A third limitation to this study is that this study represents only one ABT program associated with one survivorship program. To achieve greater validity, a larger number of ABT programs should be investigated using the same criteria.
8: Direction for future research

While a cost analysis was beyond the scope of this study, an investigation of cost savings associated with any reduced physical and psychosocial side effects resulting from the implementation of the ABT intervention early in treatment would be a valuable component in future research. Such effects, extended over the lifetime of an adolescent cancer survivor, would be necessary for justifying the application of the principles outlined in this study into interior environments. Further research into other therapies such as light, music, and color would also add to the depth of this study.

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References


Caldwell, R. (2002, November 19). Take pride and conquer ; young cancer survivors are finding that meeting the challenges of nature can help build their confidence; - and make them feel much better, writes REBEC-CA CALDWELL. The Globe and Mail (Canada), pp. R7.


Cole, S. W., Yoo, D. J., & Knutson, B. (2012). Interactivity and reward-related neural activation during a serious videogame. United States:


Gillis, L. H. (1985). An active adventure for groups. (). Georgia School Counselors Institute:


16


