



## Critical Review on Factors That Influence Continuous Engagement Towards CCBT

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**Abstract** – Substance abuse is an epidemic that spreads among adults, adolescents and even children in Malaysia. Substance abuse is categorized as a mental disorder, whereby, Cognitive Behavioural Therapy (CBT) is an approach that provides face to face physiological therapy for patients could resolve this issue. Computerized Cognitive Behavioural Therapy (CCBT) is a progression of information technology that is provided for patients encounter substance abuse. CCBT is a computerized therapy conducted at patient's own pace. Ensuring patient's continuous engagement towards CCBT becomes an issue. Patients that experience early gains, loss of interest and improvement symptom would sign up for alternative services that eventually causes disengagement and dropout from CCBT program. Interface design for CCBT is known as one of the important elements that effects patient's engagement along CCBT program. Therefore, in this study, influential factors regarding CCBT's interface design was investigated, whereby, five prominent models was reviewed. Content analysis methodology was employed to discover influential factors regarding CCBT's interface design. Four influential factors was discovered namely engagement, dropout, culture and interface. These factors are known to ensure patient's continuous engagement towards CCBT program. CCBT's interface design plays a vital role in delivering the therapy program. Indirectly, CCBT's interface design plays an important role to ensure patient's continuous engagement till the completion of CCBT program. Therefore, these factors would guide researcher, service provider, developers and clinicians in designing engaging interface for CCBT.

**Keywords:** CCBT, continuous engagement, influential factors, interface design, substance abuse

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### Introduction

Nowadays, cases of substance abuse in Malaysia are on the rise. According to the Malaysian Anti-drugs Agency, 13605 new cases and 8172 recurring cases are reported in the year of 2014 and rising every year. Tremendous efforts are made by the Malaysia government to curb issues on substance abuse. Substance abuse is defined as an addiction towards drugs, gambling, cigarettes, alcohol, video games and internet (Chiauzzi & Gammon, 2012). An addict who achieve pleasure towards substances abuse will continue to be extremist, immoral and irresponsible. Various method of treatments for substance abuse are available. Majority of the treatment methods employ therapy that focus on patients cognitive and behavior. Cognitive Behavior Therapy (CBT) is a therapy for patients suffering from psychological disorders that requires structured face to face therapy sessions with counsellors (Beck, Rush, Shaw, & Emery, 1979; Wolpe, 1958). CBT focuses on the importance of behavior in influencing the thoughts and emotions. However, Information Technology (IT) had spawned in providing therapy through CBT to provide better method of delivering therapies to patients. The birth of Computerized Cognitive

Behavioural Therapy (CCBT) is triggered by advancement of IT that aims to provide reliable and convenience therapy for substance abuse patients. CCBT patients uses self-monitoring method that includes CBT elements through interactive computer interface, computer program or internet between appointments with counsellors (Kobak, Greist, Jacobi, Levy-Mack, & Greist, 2015). However, there are several issues present regarding patients adapting CCBT. Patients are required to interact with CCBT's interface continuously until end of the therapy. Therefore, success of a patient to complete a therapy is determine by their continuous engagement towards CCBT (Barazzone, Cavanagh, & Richards, 2012; McLellana, Kemp, Brooks, & Carisea, 2008). In another words, dropout among patients could happen due to poor engagement towards CCBT. Furthermore, it would cause disengagement and incompleteness of the therapy. This paper reviews CCBT's usage and explore the patient's challenges in term of continuous engagement towards CCBT. It aims to summarize previous literature and critically reviewing derived factors that influence continuous engagement towards CCBT. This paper contributes to the literature accentuate actions that researcher, service providers, developers and clinicians can take into account to increase patient's engagement towards CCBT.

### **Computerized Cognitive Behavioural Therapy (CCBT)**

Developments in technology over the past 20 years have permitted an innovative, self – monitoring in the form of computerization. The advent of cheap home computing and the growth of the internet has invariably led to the translation of effective psychological interventions into computerized formats.

The advantages of current technology expands CBT in providing therapies to patients. CCBT is a self-monitoring method that includes CBT elements that are sustained to guide self-reflection of a patient through interactive computer interface, computer program or internet (Kobak et al., 2015). The programs themselves are interactive, typically incorporating video clips, audio voice-overs, animations and static images. The program may include a narrator (e.g. a “therapist”) who will guide the patient through each session using voiceover or video (Marks & Cavanagh, 2009).

CCBT provides convenience towards patients that reduces waiting time, avoid stigma and no time off (Jeon, Riener, Lee, Schuett, & Walker, 2012) from normal working hours (Andrews, 2010). It offers a wide range of potential benefits including improved, readiness and consistently effective treatment that can be carried out at patient's own pace.

### **Review on CCBT models**

The potential benefit of CCBT programs for patients suffering from substance abuse is supported by large number of literature. Evidence proves that there are several common factors that can be obtain and relevant to pursue our studies. In this section we discover related factors from previous literature. Previous studies discussed four substantial influential factors to the existing literatures on CCBT.

Firstly, we reviewed a model that was developed to provide guideline for researchers, service providers and developers. Study by (Cavanagh & Millings, 2013) develop ‘4 Ps’ model that emphasize on four factors: program, problem, person and provider. Each factors associated with engagement and disengagement with CCBT. This represent a challenge for CCBT researchers, service providers and developers on the importance of continuous engagement towards CCBT. However, the model is not suitable to be adapted, because the model fail to emphasize in-depth regarding influence of engagement on local context is not discussed.

Secondly, we reviewed a study that discuss on web based interface. Outcome from this review, we had discovered several common factors. Engagement towards technologies studies were explored by O'Brien and Toms (O'Brien & Toms, 2008). Their research derived from qualitative study that developed a framework. Analysis were obtain through results by conducting semi-structured interviews to identify user's perceptions about engagement towards web based interface. Similar study by Attfield (Attfield, Kazai, Lalmas, & Piwowarski, 2011) develop a framework that produced an interface design guidelines for measuring the engagement of users towards front-end web technology. Indirectly, user's engagement towards technology is crucial to ensure the success of an application.

According to O'Brien and Toms (O'Brien & Toms, 2008) and Attfield (Attfield et al., 2011) studies underline several common factors on influencing users engage continuously to application's interface. Therefore, those common factors are applicable to studies on continuous engagement towards CCBT.

Thirdly, the review on previous CCBT literature that focus on culture background was examined. Continuous engagement towards CCBT immensely will increase in the event that element of local context are take into account (Mokhtar & Anuar, 2015; Saidin, Singh, & Drus, 2017). Such similar approach was applied by previous researcher that developed CCBT which considers local context in the interface design (Shepherd et al., 2015). Their research resembles common features of CCBT that designs computer games named Smart, Positive, Active, Realistic, X-factor thoughts (SPARX) for young indigenous adolescents who faces depression.

SPARX interface design represent the indigenous culture of a specific country. Amongst SPARX's uniqueness, it provides interface of gamification, cultural symbols, cultural character, artwork and local language. Thus, indigenous adolescents felt elated to carry on until the completion of therapy by exhibiting local culture on SPARX'S interface design. The interface design look appealing that comprises culture background which represent one particular country only.

Fourthly, the effectiveness of patients towards CCBT may not be achieved from different cultures (Jaeggi, Buschkuehl, Jonides, & Shah, 2011). Brain Powered Games (BPG) is another CCBT application that was developed for cognitive training and rehabilitation of children in Uganda, Africa (Giordani et al., 2015). Their study provides CCBT that would increase the interest of Ugandan children by emphasizing interface design that focuses on environment, objects and motives. Indirectly, continuous engagement towards CCBT will increase and the possibility of children's dropout will not occur due to attractive interface that underline local context.

Finally, another similar study emphasis on the development of a framework aimed for providers, researchers and clinicians who are interested in integrating e-mental health resources into primary care in Australia (Reynolds, Griffiths, Cunningham, Bennett, & Bennett, 2015). E-mental health (CCBT) funded the development and deployment that is strictly aim for Australians with mental problems to undergo therapy. Therefore, in order to provide CCBT efficacy, the framework must implemented at the early stage by the provider that emphasizes on the importance of the interface design which would encourage continuous engagement of patients towards CCBT.

As a summary to the reviewed five models, study by Cavanagh and O'Brien (Cavanagh & Millings, 2013; O'Brien & Toms, 2008) had outlined several common factors that influence user's continuous engagement towards CCBT are identified. However, their study did not emphasis on cultural background. Therefore, there are future possible studies on patient's continuous engagement towards CCBT in Malaysian context.

Finally, studies by Giordani, Reynolds and Shepherd (Giordani et al., 2015; Reynolds et al., 2015; Shepherd et al., 2015) stressed on continuous engagement towards CCBT. Their studies emphasize on the importance of providing an engaging CCBT interface that contains local culture background. Therefore, based on the five reviewed engagement models, dropout, culture and interface, were all common factors that constitute to continuous engagement towards CCBT.

### **Engagement towards CCBT**

Previous section has discussed the common factors derived from five models reviewed that influenced continuous engagement towards CCBT. Table 1 shows the illustration on frequency of each common factor from the five models.

<b>Model</b>	<b>Cavanagh &amp; Millings, 2013</b>	<b>O'Brien &amp; Toms, 2008</b>	<b>Shepherd et al., 2015</b>	<b>Giordani et al. 2015</b>	<b>Reynolds et al., 2015</b>
Engagement	Motivation	Guideline	Relaxation	Attention	Coaching
Dropout	Early gains Improvement Other services	Lost interest Distraction	-	Language Poverty	-
Culture	-	-	Relevance Appealing	Sensitive Understanding Response	Appropriate
Interface	Interactive Preference Need	Usability	Cultural relevance	Straightforward Usability Ages difference	Interactive

*Table 1: Review factors influencing continuous engagement towards CCBT.*

### **Engagement**

Engagement is the utmost importance activity between patients and CCBT to ensure success of a patient's therapy. All five models discussed thoroughly on engagement ensuring patient's continuous involvement and commitment towards CCBT. Models introduced by researchers emphasis on motivation (Cavanagh & Millings, 2013), relaxation (Shepherd et al., 2015) and attention (Giordani et al., 2015) merely focuses on increasing continuous engagement. Researchers discussed on ensuring patient's willingness to repeat, learning simplicity and problem solving capabilities throughout the therapy. Therefore, patients proactively prepare their emotions in various situation to complete CCBT. Whereas, studies by (O'Brien & Toms, 2008) and (Reynolds et al., 2015) focuses on users experience interaction towards application. However, the study provides guideline to design an interface that draws, attracts and holds users attention. Therefore, further research attempt could be proceed that align with the guideline provided by the researcher, policy maker, provider and clinicians in ensuring patient's continuous engagement towards CCBT.

### **Dropout**

Patients are required to interact with CCBT's interface continuously to avoid dropout from the therapy (Barazzone et al., 2012; McLellana et al., 2008). Synthesizing from five models as illustrated in table 1 shows that studies by Shepherd and Reynolds (Reynolds et al., 2015; Shepherd et al., 2015) does not discuss dropout factor. However, similar issues have been discussed by both researchers regarding dropout factor mainly based on patient's early gains, loss of interest, symptom improvement and sign up for other alternative services (Cavanagh & Millings, 2013; Shepherd et al., 2015). A study in Africa shows that constraint of patients towards language used while using CCBT and assistance are needed to provide necessary translation services (Giordani et al., 2015). Therefore, in order to avoid dropouts, requirement of an appropriate interface design for CCBT is crucial (Heimgärtner, 2013) to ensure continuous engagement towards CCBT.

### **Culture**

Element of local contexts (Sarsam & Al-Samarraie, 2018) are prone to increase continuous engagement towards CCBT (Mokhtar & Anuar, 2015). Thus, culture factor should be taken into consideration for this study to ensure continuous engagement towards CCBT. Amongst the five models reviewed, there are no further discussion on culture factor by two of these studies (Cavanagh & Millings, 2013; O'Brien & Toms, 2008), while the rest of the studies mention on the importance of culture factor. The exploration of cultural relevance are amongst the mentioned factor (Giordani et al., 2015; Reynolds et al., 2015; Shepherd et al., 2015), furthermore, the motivation and level of success for patient enrolled in CCBT program merely depends on culture factor. Therefore, researchers, service providers, developers and clinicians can take into account to provide an appropriate interface design that increases patient's engagement towards CCBT that contains cultural sensitivity.

**Interface**

Cultural sensitivity and relevance interface promises increment of patient’s continuous engagement towards CCBT. Apart from that, designing interface that consist of local context lies several guidelines which are identified and discussed in five models (Cavanagh & Millings, 2013; Giordani et al., 2015; O’Brien & Toms, 2008; Reynolds et al., 2015; Shepherd et al., 2015). Overall, these five models emphasizes on interactivity of interface design that should be matched to the patient’s preferences and needs (Andersson & Cuijpers, 2009). Moreover, the interface design of CCBT should features response requirement and principles that are straightforward not only for patients, but also for counsellors. Furthermore, usability of CCBT’s interface design should fulfill patient’s requirements such as touchscreen abilities and age differences.

The outcome of critically reviewed factors shows interface design has a significant impact that influence patient’s continuous engagement towards CCBT. Hence, to realize this matter researcher, policy maker, provider and clinicians ought to provide a guideline for appropriate CCBT interface design. In addition, the design of appropriate interfaces must take cultural sensitivity, usability and age differences into account.

<b>Model</b>	<b>Engagement</b>	<b>Dropout</b>	<b>Culture</b>	<b>Interface</b>
Cavanagh & Millings, 2013	✓	✓	x	✓
O’Brien & Toms, 2008	✓	✓	x	✓
Shepherd et al., 2015	✓	x	✓	✓
Giordani et al. 2015	✓	✓	✓	✓
Reynolds et al., 2015	✓	x	✓	✓

*Table 2:* Frequency of factors in five related models.

The critically reviewed factors are summarize in table 2 which illustrate the frequency of factors that exist in the five models. The most common influencing factors discovered are engagement and interface. These two factors are crucial in order to provide an interface which is engaging enough for patients that would encourage continuous engagement towards CCBT. Although dropout and culture factors are less influential, these factors can be also taken into consideration to design interface for CCBT.

**Conclusion**

In this study, researchers identified and critically reviewed factors such as engagement, dropouts, culture and interface that causes the existence of issues on engagement towards CCBT. Ascertain patient’s continuous engagement, CCBT should provide relatively attractive interface for patients to experience therapies completely. Furthermore, cultivation of local context would produce attractive interface that would enhance patient’s continuous engagement towards CCBT. Therefore, considering design elements from previous literature that CCBT’s interface design implements appropriate culture

to Malaysian context would lead to patient's continuous engagement and dropout could be avoided. Finally, by reviewing critically influential factors from previous studies as presented in this article on related research regarding interface design for patient's continuous engagement towards CCBT would assist and initiate future research works among researcher, service provider, developers and clinicians. Besides that, it would also trigger future study of interface design for CCBT which considers local context.

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