

## Assessing Content Validity in the Development and Application of B-COME Intervention for Emerging Adults

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The effectiveness of online interventions addressing psychological and behavioural concerns has always been questioned despite their application to a larger number of people in need as compared to traditional face-to-face delivery of interventions. However, if the content of the intervention is based on a particular program theory or model of change and if there is an appropriate match between the activities of intervention and theory, it can be proved to be effective enough for its online application. The present study aims to identify the “content validity” of theoretically based e-intervention designed for emerging adults using a feasible method of assessing content validity. In the present study, an already established 5-step method was used to assess the content validity of e-interventions which includes defining intervention target objectives, specifying intervention activity-target pairings, Recruiting experts from diverse geographical locations, preparing a Google form as a survey tool for ratings by the expert reviewers on the relevance, likely effectiveness and its appropriateness among specific intended audience. This method was applied in the present study for the development of B-COME interventions designed for emerging adults. A total of 8 experts were invited from 5 different states of India to rate all the activities of the present interventions in three domains. Quantitative indicators of expert ratings showed that all the intervention activity-target pairings had excellent item-level content validity indexes on all three domains. However, three activities required minute changes based on the narrative comments of experts.

**Keywords:** Content validity, online intervention, emerging adults

The online adaptation of psychological and behavioral interventions has increased a lot these days. As compared to the traditional method of face-to-face interventions, online delivery of interventions has also proved to be effective and relevant if grounded in a strong theoretical background. Online interventions can be the adaptation of either already developed face-to-face interventions or they can be developed from scratch if it has empirical evidence based on a program model or theory (Winston & Jacobsohn, 2009).

To produce desired modifications in behavioral outcomes, intervention activities should target specific psychological or

behavioral processes. The development of an online or e-Health intervention which is grounded in a theoretical background appears to be more effective. It has also been found in a meta-analytic study of 85 studies that interventions that are based on a particular theory have greater effect sizes (Webb et al., 2010). Previous intervention research has also shown the effectiveness of online interventions in reducing internet use disorders. In a study by Pape et al., 2023, it was found that web-based therapy sessions can provide a lot of people in need a platform where they can be treated with their internet use disorder. They also discussed the reachability and accessibility of online-based treatment approaches. In

another study by Ash et al., 2023, various barriers and facilitators were discussed in providing online School intervention to reduce racial trauma. Receptivity, logistics, engagement, comfort and application of training were few benefits and challenges to the implementation of online training. Further, it has been found that telemedicine services or web-based short-term therapy including developing motivations and can be useful in addressing people affected with problematic internet use including symptom severity and reduction in duration (Bottel et al., 2021; Bottel et al., 2022).

### **Concept of Content Validity and its applicability to online interventions**

Content validity refers to the degree to which an item or element of the assessing instrument is relevant to the targeted construct and represents that construct for its assessment purpose (Haynes et al., 1995). Content validity is an important sub-component of construct validity as it tells to what degree the assessment instrument's elements are relevant to and representative of its target construct. Based on the methods and purpose of assessment, item or elements of an instrument differs in its wordings, instructions, and based on how the stimulus is presented (Haynes et al., 1995). Content validity can be a qualitative, quantitative, or multi-method process that can be applied to all the elements of an assessment instrument. Usually, the content validity is done to assess the items of a questionnaire but in this paper, it is referred to assess the elements of interventions developed with the help of expert reviewers so that activities of the interventions can be revised.

Based on the above definitions and attributes of content validity in the development of an instrument, the definition of content validity for the present online interventions can be viewed as 1. The extent to which the activities of the present

intervention are relevant to the underlying program theory (construct) (not presented in this paper) 2 Its likely effectiveness in achieving the particular intervention target among the desired audience and 3 its likely appropriateness for the intended population for whom the intervention has been developed. So, there are three important dimensions of content validity for expert reviewers. The first dimension is *relevance*, the extent to which the intervention activity is appropriate to its intended intervention target objective. The second dimension is *effectiveness*, the extent to which this specific intervention activity would change the intended intervention target by viewing the expert judgment and all the evidence. The third dimension is its *appropriateness* for an intended population which can be defined by gender, age, etc (Kassam-Adams et al., 2015).

### **Present study**

For numerous reasons, content validity should be done at multiple stages while developing online interventions. An online intervention is more likely to be effective and useful in its psychological and behavioural processes if the contents of the interventions are developed based on a delineated theory or model of change (Riley et al., 2011). However, after the development of intervention activities along with its target objectives, the next steps can be challenging including the design and how to deliver the interventions to its intended target audience. Hence, to make this process more scientific, a proper procedure should be there including a formal content validation procedure which should ensure the design of intervention activities and whether these activities apply to the program theory or model of change that they are intended to work upon. The review of specific activities of an e-intervention program during the development phase is facilitated by the set of pre-determined activities in the delivery of an

electronically-based intervention program. The content validation process and its results can provide useful information in honing the intervention activities so that better results would come by reducing its cost during the initial stage of intervention development itself.

Undoubtedly, this type of formal assessment of content validity will enhance the quality of interventions to be delivered and will also help to hone the activities that seem unsuitable for intervention delivery. Thus, the present paper aims to define the content validity of online interventions as it is generated from a valid program theory/model using a practical approach to assess the content validity of online interventions and apply this method in the development of B-COME interventions for emerging adults. A formal assessment of experts from different backgrounds helps these intervention activities to match with the program theory or model of change on which this intervention development is based.

### **Method**

#### **Expert Review process for Content Validity**

There is a 5-step systematic approach to assessing the content validity of the online interventions from expert reviewers proposed by Kassam-Adams et al, 2015. This process includes rating of all the intervention activities by the expert reviewers based on an already established program theory or model of change on which intervention activities are based. The following are the steps of this approach:

*Step 1-* Specify the intervention target that this online intervention program aims to assess. Concerning the present intervention study, there are target objectives developed to ensure the rationale for each intervention activity.

*Step 2-* Specify the intervention-target pairings. Each intervention activity should be

related to one or more target objectives. An intervention activity is mostly psycho-educational and has some target objectives to achieve. For the easy understanding of expert reviewers, each intervention activity should be described in detail and for the present study, each intervention activity and intervention-target pair is presented in the table1.

*Step 3-* Develop a content validity survey tool in the form of a Google form with each activity-target objective pairing. For each activity-target objective pairing, there are scales for the relevance of intervention activity, likely effectiveness, and appropriateness for the intended audience.

*Step 4-* This step involves the recruitment of experts who were not involved in the development of present interventions in any way. The expert reviewers should be diverse geographically. They should possess content knowledge and expertise. The ideal number of experts is 8-12 (Polit et al., 2007) for the initial stage of the review process and 3-5 experts are ideal for the follow-up stage after honing the interventions. Expert reviewers should be provided with all the details of the intervention activities such as videos, pictures, case studies, art-related information, etc. after which they will be given a Google form where they are supposed to rate each intervention activity.

*Step 5-* the final step is to analyze the results both quantitatively (by calculating the content validity indices) and qualitatively (by analyzing the narrative comments of the experts). Based on these results findings, the developers of the interventions are supposed to remove some of the intervention activities or are supposed to refine those that are problematic activities so that better results could be achieved.

Based on quantitative indicators of acceptable content validity, both item-level and scale-level content validity indices (I-CVI

and S-CVI/AV) were found. For online interventions, an “item” is a pairing of activities and target objectives, and a “scale” is a set of activity-target pairs (Polit et al., 2007). Those expert reviewers who rated the item as 3 or 4 were constituted as I-CVI proportion (0.00 to 1.00). Averaging all the I-CVIs would constitute S-CVI/AV (Polit et al., 2007). To obtain excellent content validity for interventions, I-CVI should be at least .78, and S-CVI/AV should be at least .90 (Polit et al., 2007).

Both quantitative indicators and qualitative judgments of the development team are involved in honing and improving the intervention activities after obtaining the results of the content validation process. So, if there is some problem with a particular I-CVI of a certain activity-target pair, then the next step is to identify the type of problem. If an item is not relevant to its target then the activity should be considered again. If the activity is low in its effectiveness, then the team should examine whether there is any way to increase its effectiveness. On the other hand, narrative comments of expert reviewers on each activity also provide an indicator of the relevance and effectiveness of that particular activity. Hence both quantitative and qualitative indicators are useful in the application of final interventions.

### **Application of this method to B-COME interventions**

#### **Description of B-COME**

B-COME is an online intervention designed to effectively deal with childhood trauma, reduce alexithymia among adults, and decrease problematic internet use among young and emerging adults of age between 18 and 25 years old who have experienced some kind of trauma in their life due to which they are unable to describe their emotions as well as identify other’s emotions and are using internet problematically to deal with this lack of emotional skills in their lives.

The intervention activities are structured with mindfulness and case studies to develop emotional, cognitive, and behavioral skills among participants.

Grounded in the empirical literature on post-traumatic growth, alexithymia, and problematic internet use etiology there are three proximal goals for implementing B-COME interventions. 1. Emotion awareness and expression. 2. Motivational and cognitive-behavioral skills. 3. Behavioral skills including Mindfulness.

#### **Application of 5-step Content Validity process to B-COME interventions**

For Step 1 (Specifying key intervention target) throughout the development process, we developed 36 key targets that address the mechanisms to prevent alexithymia, and problematic internet use, and to effectively deal with the trauma.

For Step 2 (Specifying intervention-target pairing) we invented 30 intervention activities, each activity addressing one or more of the 36 target objectives, resulting in a total of 36 intervention activity-target pairs. Each intervention activity was designed to address one or more target(s). So this step required more effort in its development stage to see if the targets are suitable for each intervention activity.

For Step 3 (Preparing Google form as survey tool) a Google form was created with three ratings for each of the 36 intervention-targets pairs. Experts were supposed to rate on three dimensions for each of the intervention-target pairings i.e. activity’s relevance, likely effectiveness, and age-appropriateness, using a 4-point Likert scale i.e. from 1-4. (1) *Relevance* (the extent to which the intervention activity is appropriate to its intended intervention target/objective) with 1 defined as “irrelevant or extraneous to this target objective” and 4 defined as “relevant or essential to this target objective”,

(2) *effectiveness* (the extent to which this specific intervention activity would change the intended intervention target by viewing the expert judgment and all the evidence) with 1 defined as “not likely to be effective” and 4 defined as “very likely to be effective”, (3) *appropriateness for the intended audience*. For the present study B-COME interventions, it is defined as age-appropriateness for the interventions (in this study, content, nature, and language of the activities should be understandable and comprehensive by the people of 18-25 years old) with 1 defined as “inappropriate or unsuitable for 18-25 years” and 4 defined as “appropriate or suitable for 18-25 years”.

For Step 4 (recruitment of experts) A national set of experts was randomly selected and invited to rate the B-COME interventions. All the experts were professors who had expertise and knowledge concerning emotion awareness and regulation, problematic internet use, and post-traumatic growth. All the experts were told and shown all the minor details of the intervention activities such as pictures, case studies, poems, etc. The details of each activity were given to them in an online meeting where they were invited through an official email ID to join on a particular date and time. A Google form was also emailed to them where brief information about the activities was mentioned. They were asked to fill out that Google form in the desired time and their responses were submitted. Expert reviewers were asked to rate all the activities and also provide any additional comments on each activity or complete intervention as a whole. This expert validation process does not require any human subjects hence no ethical approval or approval from the review board was required.

For Step 5 (Analysis of results and honing the interventions) initially the I-CVI for each activity-target pair was calculated for each dimension; the I-CVI is the percentage of

reviewers who rated an activity as 3 or 4 on a 4-point Likert scale (1-2-3-4). After that, S-CVI/AV was calculated for each dimension (Relevance, likely effectiveness, and age-appropriateness) by averaging all the I-CVIs of that particular dimension. Narrative comments of expert reviewers were also considered for each activity or overall intervention. These results along with the pilot program were used in revising the B-COME interventions.

## Results

### Overview

A total of 10 experts (from Delhi, Pune, Tamil Nadu, Mizoram, and Bangalore) were selected randomly and invited to participate via email; among them, only 8 experts agreed to participate and provide ratings. None of the experts were involved in the development of interventions. Each expert was a psychologist and professor from a prestigious university who has experience and relevant knowledge in this field. 7 experts provided ratings within one week of the conduction of the meeting and one expert took some more time but eventually provided the ratings. No incomplete ratings were found from any of the experts.

### Quantitative Indicators of Content Validity

Table 1 shows the I-CVI for each intervention activity-target pairing, based on expert ratings on content validity Google form.

The S-CVI/AV for ratings across all the intervention activities was excellent for relevance (.98), excellent for likely effectiveness (.98) as well as for age-appropriateness (.99). Considering the quantitative indicators for each item i.e. I-CVI for all activities-target pairing on all the three dimensions i.e. relevance, effectiveness, and age-appropriateness were excellent (>.78). Although the quantitative indicators for both

I-CVI and S-CVI/AV were excellent for all the activities in all three dimensions based on the expert's ratings, their narrative comments were also considered to determine whether any activity needs improvement or refinement in the next iteration of interventions.

### Narrative Comments from Expert Reviewers

Besides quantitative ratings from the expert reviewers, narrative comments are useful in assessing the strengths and weaknesses in the iteration of B-COME interventions. A few reviewers commented on 3 separate activities and all the experts commented on overall interventions where they approved the activities by saying "Overall interventions seem very promising, looking forward to reading its findings" and

"appreciation for developing a well-structured module". One of the experts advised reducing the number of activities which was incorporated in the final iteration of interventions. One expert advised seeing the separate impact of cognitive-behavioral, emotional, and mindful interventions. In one activity (exploring different feelings and emotions of the protagonist), one reviewer commented to psycho-educate them on moods, emotions, and feelings. In (Body scan meditation), the reviewer's advice was that a demonstration should be given to the participants, and the (making a song/poem exercise), an expert commented "Not everyone can put their feelings in words, some picture/paintings should be included" which was added in the final version of interventions.

Table 1. Intervention activities and intervention targets of the intervention, with item-level Content Validity Index for each activity-target pairing.

Intervention activity	Intended intervention target(s) for this activity	Relevance of activity to target	Likely effectiveness of activity	Age appropriateness of activity
1. Psycho-education about variables in the study	To develop a basic understanding of every variable.	1.0	1.0	1.0
2 Ice Breaker Activity- Passing around the ball	To increase the group's cohesiveness and familiarity with the topic.	1.0	1.0	1.0
3 Raisin Exercise	Participants will be equipped with a new mindful activity.	1.0	1.0	.87
4 Emotion awareness	To make participants aware of different emotions they are presently experiencing	1.0	1.0	1.0
5 Psycho-education about emotions	Participants will get to know about different self-emotions	1.0	1.0	1.0
6 Feeling emoji exercise	To enable participants to describe their feelings on the based on scenarios and make them aware of their feelings.	1.0	.87	1.0
7 3-min breathing space	To be aware of the present moment while focusing on breathing	1.0	1.0	1.0
8 Make a song or poem.	To enable participants to think and creatively express an emotional experience.	.87	1.0	1.0

9 Thought and feeling exercise	Participants will be able to name the emotion	1.0	1.0	1.0
10 body scan meditation	Participants will be aware of the present moment while focusing on different parts of their bodies.	1.0	1.0	1.0
11 Parcel of emotions exercise	1. Participants will be able to recognize other's emotions 2. Participants will be able to develop a deeper understanding of emotions.	.87	.87	1.0
12 Exploring different feelings and emotions of protagonist	1 with the help of the case study approach, participants will empathize with the protagonist 2. Participants can learn to observe their inner states and self-monitoring.	1.0	1.0	1.0
13 Internet Decorum	Participants will gain knowledge about maintaining balance	1.0	1.0	1.0
14 Psycho-education	To enable participants to understand that problematic internet use is more about emotion dysregulation.	1.0	1.0	1.0
15 Motivation skills	1 Participants will be aware of negative consequences and unpleasant emotions leading to Problematic internet use. 2. Participants will understand that internet usage generates short-term positive feelings	1.0	1.0	1.0
16 Breaking the Chain of events (COE): encouragement of interests.	To enable participants to identify their hidden interests and talents.	1.0	1.0	1.0
17 Mindfulness of breath	To enable participants to learn how to relax themselves. They will be more attuned to their internal sensations.	1.0	1.0	1.0
18 Identifying negative thoughts	1 To enable the participants to understand favorable and unfavorable evaluations in the form of negative distortions. 2 Participants will learn to identify their dysfunctional thoughts.	1.0	1.0	1.0
19 Cognitive Restructuring	1 The Participants will be able to restructure the negative thought patterns of the protagonist and their own.			

	2 They will learn to develop more positive thinking amongst them.	1.0	1.0	1.0
20 Mindfulness of thoughts	Participants will learn to accept their thoughts, let them in, and go.	1.0	1.0	1.0
21 Adaptive behavior training	To enable the participants to achieve behavior change for the protagonist	1.0	1.0	1.0
22 My new plan to be applied in daily life	To enable participants to Achieve behavior change for self	1.0	1.0	1.0
23 Psycho educating on thoughts	Participants will begin to see thinking as a mental activity	1.0	1.0	1.0
24 Narrating personal life experiences	Enhancing the strengths of participants to cope with post-trauma symptoms.	1.0	1.0	1.0
25 Egg drawing activity	1 To change the participant's perception of their trauma by working on unpleasant experiences.			
	2 To enable participants to recognize their past aversive and traumatic memories.	.87	.87	.87
26 Goal setting activity	To enable participants to learn to acknowledge things that is in their control.	1.0	1.0	1.0
27 Catharsis Activity	To learn to allow the painful memories of past traumas to come, accept, and go.	1.0	1.0	1.0
28 Poem "the guest house"	Participants will develop a positive relationship to unwanted feelings.	1.0	1.0	1.0
29 Summarizing the importance of whole intervention program.	To enable participants to understand the importance of the intervention program.	1.0	1.0	1.0
30 Maintenance strategies	Participants will learn how to deal with unpleasant and difficult situations in the future which can be a lifelong learning.	1.0	1.0	1.0

### Discussion

The present study aimed to convey the importance and usefulness of assessment of content validity for the development and iteration of online interventions. The ratings of the experts on the content validity Google form indicated that the content of intervention activities is appropriate and useful for its implementation among the participants except for little changes in three activities.

The essential elements of a successful intervention are assessment of content validity which can decrease the subsequent revisions of the intervention activities and can lead to an effective online intervention program.

The content validity assessment is done to ensure that the intervention activity matched its target objective which was made with the clear application of a certain model



of change or program theory (not described) from scratch rather than online adaptation of some face-to-face interventions (Pape et al., 2023; Dieris-Hirche et al., 2021).

If the content validity of the interventions is determined at appropriate time i.e. after the development of the interventions, the developing team has this opportunity to refine or remove the intervention activities to improve its effectiveness and other considerations so that it can have a long-term benefit on the participant. For example: immediate refinement of the problematic activities and monitoring of these activities. In the case of the B-COME interventions, activities were honed and removed in its pilot stage itself and so the final draft of the interventions has fewer subsequent revisions based on expert ratings as relevance, effectiveness, and age-appropriateness of the activities were found to be excellent. However, based on the expert's narrative review, some changes were made in three of the activities mentioned above.

This method can be applied in determining the process of assessing content validity. In this regard, the development team needs to define the intervention activities and target objectives at an earlier stage with clear and specific target objectives for each activity so that it is easier to evaluate for the expert reviewers. In the case of B-COME interventions, we developed one or two target objective for each intervention activity that addresses the particular activity more directly rather than indirectly. If there is any discrepancy in the activity-target pairing, then step 2 should be given more consideration so that there can be a more direct and specific target addressing each intervention activity. Developers may also revisit their program theory or model of change if the activity-target pairings do not match with each other.

Another implication of this method is regarding the timings of assessing content validity. The expert review of content validity should be done when the final draft of interventions is made; pilot studies of these interventions with emerging adults are also done so that experts can access the fully developed version of interventions and so fewer modifications are required at that time. Assessment of content validity can also be done multiple times during the developing stage itself so that earlier drafts of an intervention can be revised timely.

### **Clinical Implications of B-COME intervention**

Many people face difficulty in describing what they are feeling, empathizing with others, and forming interpersonal relationships. Hence, the B-COME intervention training can be given to young and emerging adolescents and adults in Schools and Colleges so that they can be more aware of their own as well as other's feelings and emotions. This training can also be traced to their childhood experiences and can help in maintaining a balance between their real and virtual world. Moreover, Alexithymia is one of the important contributing factors in many clinical disorders such as Depression, anxiety disorders, behavioral addictions, etc. Therefore, B-COME intervention has implications in all such clinical disorders as part of early preventative measures.

### **Limitations**

There are a few limitations of the present study. Firstly, the reliability and other validity were not assessed in the present paper. Hence, it is recommended that besides finding the content validity of online interventions, their reliability and validity should also be addressed. The second limitation is regarding the I-CVI and S-CVI/

AV index. More research in the future should be done to relate these indexes with the actual effectiveness of the activities in the development of online interventions. Further, in the present study, only 8 experts could be invited to rate the interventions, in the future more expert ratings would be recommended as the ideal number is 8-12 so that better feedback about intervention activities could be given.

### Conclusion

Assessment of content validity of online interventions can be an important and useful procedure in the development of effective interventions as it can be an indicator of the intervention's relevance, likely effectiveness, and age-appropriateness. In the present study, it has been found that all the intervention activities of B-COME interventions are relevant to its target objectives. They proved to be excellent in their effectiveness and age-appropriateness after finding out the quantitative and qualitative indicators from the experts. This approach can also be used multiple times during the development of interventions so that the activities can be honed timely.

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