

# Chapter 7

## **Evaluation of Adolescent Suicide Prevention E-Learning Modules for Gatekeepers From the User's Perspective**



Submitted as:

Ghoncheh, R., Kerkhof, A. J. F. M., & Koot, H. M. (2015). Evaluation of Adolescent Suicide Prevention E-Learning Modules for Gatekeepers From the User's Perspective.

## Abstract

**Objective:** This paper discusses the evaluation from a user's perspective of an online adolescent suicide prevention program called Mental Health Online (MHO). This program consisted of eight e-learning modules and additional information, and was designed by the researchers of this study especially for gatekeepers. The study addressed the user's perception with regard to: expectation and relevancy (1), design satisfaction (2), suggestions for improvement (3), and usefulness and recommendation to others (4). In addition, it was aimed to provide some insight about the learning behavior of the users in an online environment (5).

**Method:** A total of 83 gatekeepers completed a self-report evaluation questionnaire which was part of a *randomized controlled trial* on the effectiveness of MHO.

**Results:** All features of the program (expectations, relevance, duration, user friendliness, interaction, contentment with cases and quizzes) were positively appraised by the participants. Furthermore, gatekeepers in this study stated to have gained knowledge, self-confidence and skills in adolescent suicide prevention, and indicated that they would recommend the modules to other gatekeepers. In addition, the results showed that – even though not obligatory – almost all gatekeepers did complete all eight modules, and that the additional information was not used by many participants. Lastly, a very small percentage of the users returned to the website to refresh their knowledge.

**Conclusions:** The findings of this study suggest that the use of e-learning modules in adolescent suicide prevention is a satisfactory technique according to gatekeepers.

## Introduction

Worldwide, approximately three billion people will be using the internet by the end of 2014 (International Telecommunication Union, 2014) which makes this medium probably the system with the largest reach in the world. As a result new educational methods are emerging that not only have detached learning from time, location, and distance, but also promote unlimited access to information and take away social restrictions (Arbaugh, 2000; Berger, 1999; Tham, & Werner, 2005). Due to these advantages educators and organizations are investing more and more in online learning (or e-learning) hoping to develop a more cost-effective method for teaching (Lee, 2005). Nevertheless, there are several concerns about online programs such as time and effort to compose the course, lack of in-person interaction and uncertainties about the quality of this method compared to the traditional way of teaching which requires a classroom, teacher(s) and students (Arbaugh, 2000; Arbaugh, & Duray, 2002). Some maintain that the only way to determine the value of this relatively new way of education and to understand how successful e-learning programs can be created is through continuous communication, monitoring and research related to this new method which is expected to eventually lead to the development of a standard universal model (Lee, 2005). Although several studies have reported on the expectations and experiences of learners (Biasutti, 2011; Hourii, Watanabe, Hayashi, & Kurozawa, 2012; Murphy, Worswick, Pulman, Ford, & Jeffery, in press; Paechter, Maier, & Macher, 2010) with e-learning methods, to our knowledge none have described their construction and simultaneously evaluated them from a user-perspective. The present paper aims to present the experiences of its users regarding the design and usefulness of a modular e-learning program on adolescent suicide prevention for mental health gatekeepers. To this end we will first describe the approach taken to construct the program explaining the considerations that lead to its final form.

In 2011, researchers from the VU University in Amsterdam started with the development of an online program entitled Mental Health Online (MHO) which aimed to train gatekeepers (defined as professionals who can come in contact with people at-risk for suicide; Isaac et al., 2009; Mann et al., 2005; WHO, 2012) in early recognition, guidance and referral of suicidal adolescents using e-learning modules (Ghonchek, Vos, Koot, & Kerkhof, 2013; Ghonchek, Kerkhof, & Koot, 2014a). Although suicide prevention e-learning modules for gatekeepers are increasingly available, a recent systematic review showed that research with regard to the effectiveness of these modules is lacking (Ghonchek, Koot, & Kerkhof, 2014b). In response to this we created MHO e-learning modules (Ghonchek et al., 2014a) using the available literature on computer based learning from other disciplines and consultation of gatekeepers. The consulted gatekeepers believed that many fellow-professionals lacked basic

knowledge in the area of suicide prevention and training should focus on transferring relevant knowledge from experts to the learners. They also believed that some users might have prior knowledge on this topic, and by obligating all participants to go through the entire course could be discouraging.

Thus, for the development of these modules the researchers chose to combine two learning models, the objectivist (or traditional learning model) and the constructivist model (Jonassen, 1991; Schell, & Janicki, 2013; Tham et al., 2005). A lecture format using a PowerPoint presentation with voice-over narration was used as the base of the modules to mimic the traditional in-person lecturing in which a professor lectures a group of students controlling the content of the course (the objectivist learning model; Jonassen, 1991; Leidner, & Jarvenpaa, 1995; Schell et al., 2013; Tham et al., 2005). The content of the training however was divided across eight non-obligatory short modules the presentation of which was under full control of the user. In addition users were provided with non-obligatory additional information in order to encourage learning expansion. This allowed gatekeepers to follow the content and instructions at their own pace, and to compose their own custom-made training (the constructivist model; Jonassen, 1991; Leidner et al., 1995; Schell et al., 2013; Tham et al., 2005). This high degree of learner control was believed to lead to better learning outcomes and a higher satisfaction (Piccoli, Ahmad, Ives, 2001), compared to intake of the learning materials at length in a fixed or forced order.

As part of the additional information, an online discussion board was created for the gatekeepers in order to enable asynchronous discussions and receive feedback aiming to break down any communication barriers (Berger, 1999; Tham et al., 2005), but also to verbalize their understanding of the material (Piccoli et al., 2001). The content of the modules was created in collaboration with experts in suicide prevention (Ghoncheh et al., 2014a). In order to enhance scanning of the learning materials by the users and facilitate the learner detection of the important information, the modules were constructed while accounting for the following recommendations: use short and simple phrases; use short and informative headings; use a variety forms and levels of headings; use familiar fonts and use bright colors (Miclea, Cicua, & Miclea, 2009). Cases and quizzes were presented at the end of each module providing the gatekeepers the opportunity to assess their gained knowledge. Finally, a feasibility study was conducted among a small group of gatekeepers and researchers in order to test the procedure of attending the program, and to get feedback on the design and content of the modules. The received input led to several improvements with regard to the procedure and the content of the program. Additional information on the program can be found elsewhere (Ghoncheh et al., 2013, 2014a).

A *randomized controlled trial* (RCT) on the effectiveness of the modules showed that the actual knowledge, perceived knowledge and perceived self-confidence of gatekeepers attending the modules improved significantly compared to those in a waitlist control condition (Ghoncheh, Gould, Twisk, Kerkhof, & Koot, 2015). However, research on online learning should not only be restricted to effectiveness studies, but should also focus on the user's experience with the e-learning format which is an equally important factor for adopting this medium. According to the Technology Acceptance Model (TAM), which has become a well-accepted model in the information technology literature (Arbaugh, 2000), two important variables, perceived usefulness and perceived ease of use, determine whether people will accept or reject an information technology (Davis, 1989). Perceived usefulness has been defined as whether the future user believes that a specific system will enhance the person's job performance within an organizational context, and perceived ease of use as the degree to which the future user anticipates that the target system is going to be free of effort (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). The TAM suggests that if the users perceive the delivery medium as useful and easy in use this will affect their attitudes toward their experiences with the course and will probably lead to taking more courses with the same delivery medium in the future (Arbaugh, 2000; Arbaugh, & Duray, 2002). This is why a self-report evaluation questionnaire was incorporated into the RCT study as well, addressing the experiences and thoughts of the users with the MHO e-learning modules.

The self-report evaluation questionnaire aimed to provide insight into the users' perception of the presented suicide prevention e-learning modules as an educational tool, and information about the users' perspectives on the main features of these modules. The self-report evaluation questionnaire had several objectives. First, to find out to what extent the e-learning modules met the expectation of their users, and were perceived to be relevant for their primary goal, namely conveying information on suicide prevention to be used in practice. Second, to investigate to what extent the users were satisfied with the design of the modules (duration, user friendliness, interaction, contentment with cases and quizzes), and get the target group's opinion on how the modules could be improved. Third, to investigate whether the gatekeepers believed the e-learning modules to be useful (believed to have gained knowledge, self-confidence and skills in adolescent suicide prevention), and would recommend the modules to other gatekeepers. Lastly, the study aimed to get an insight in the learning behavior of the users in an online environment (amount of modules followed, the use of additional information and refreshment of knowledge).

## Material and Methods

The evaluation of the e-learning modules of the MHO program was part of the RCT addressing the program's effectiveness for which a detailed study protocol can be found elsewhere (Ghoncheh et al., 2014a). The RCT study had a pretest, posttest and follow-up design with two arms: experimental group and waitlist control group. The experimental group had access to the MHO program while participants from the control group had to wait to get access until the end of the study. The participants of the present evaluation study were the gatekeepers who had been randomly assigned to the experimental group. During the posttest, a week after taking the e-learning modules, participants from the experimental group were asked to complete the evaluation questionnaire developed for this study. The link to the questionnaire was sent to the participants through e-mail and data was collected online. The study protocol for MHO was approved by the Medical Ethics Committee of the VU University Medical Centre Amsterdam (registration number 2009/328).

### Participants

The inclusion criteria for participation in this study were being a Dutch speaking gatekeeper 18 years or older (1), who worked frequently with adolescents aged 12 to 20 years (2), whose profession involved responsibilities with regard to the (mental) healthcare of adolescent (3), and who had access to the internet (4) (Ghoncheh et al., 2014a, 2015). A total of 190 gatekeepers completed the baseline assessment and were randomized in the RCT study on the effectiveness of the MHO program with 94 in the experimental group and 96 in the control group (Ghoncheh et al., 2015). Participants were between 21 and 62 years old ( $M = 44.82$ ,  $SD = 10.77$ ) and 81.7% were female. The majority (68%) of the gatekeepers worked in a school setting as a mentor, counselor, teacher or social worker), while the rest (32%) worked in a (mental) health related setting or institute as a psychologist, behavioral scientist, youth health care nurse or psychiatrist. Participants in this study had either a higher vocational (58.5%) or university degree (36.2%), or had advanced education on top of higher vocational or university training (5.3%). All participants were located in the Netherlands, except one participant who lived in Belgium.

### MHO program

The MHO program was embedded in the website <http://www.MentalHealthOnline.nl> (Ghoncheh et al., 2014a) and was only accessible with a valid username and password. Participants had access to the website and thus to the program 24/7 from any given location as long as they had access to the internet. After entering the username and password on the

login page, the user landed on the main page of the program containing five subpages. The first subpage contained the eight e-learning modules. The remaining four pages included additional information on (adolescent) suicide prevention in support of the modules. Technical support was provided to the participants throughout the study by the main researcher. In addition, alongside their username and password, participants received a manual to guide use of the website. Although the overall design and use of the website was quite easy, a manual was included just in case some users might appreciate a stepwise overview of how to log into the website and open the available material (modules and additional information).

### *E-learning modules*

Each module captured an aspect of the process of (early) recognition, guidance and referral of suicidal adolescents (12–20 years) (Ghoncheh et al., 2013, 2014a, 2015). An overview of the eight modules and their objectives is given in Table 1. When the user clicked on the e-learning modules, a webpage opened containing an overview of the eight modules including information on the learning objective, relevance and duration of each module. Following all eight modules was not obligatory for the participants. Gatekeepers were allowed to pick any module based on their knowledge and needs. Consequently, gatekeepers were able to open each module or quickly navigate through them and then decide whether the module was worth following.

The content of each module was composed using Microsoft PowerPoint with features such as text, voice-over, animation, graphs, cases and quizzes. Then Adobe Presenter 7 was used to convert the content into one package. When a module was selected, its content would load on a separate webpage, and a start button caused the module to take-off. The user was in control of the course of the module, could pause, forward and backward each sheet at any given point, and could turn the voice-over on or off as desired. At the end of each e-learning module, the participant was presented with four short cases and four quizzes on the content of the followed module which served as a measurement tool for their gained knowledge. On average the duration of each module was four to nine minutes, excluding the cases and quizzes.

**Table 1.** Overview of the Eight E-learning Modules of the MHO Program

<b>Module</b>	<b>Learning Objectives</b>	<b>Duration*</b>
1. Suicidality among adolescents	Discusses what suicidality is, how often suicidality occurs among youth, which suicide methods are most commonly used and why young people commit suicide.	8 minutes
2. Risk factors	Elaborates on which factors pose a risk for suicidality, which risk factors are the most important ones and when suicide risk is the highest.	6 minutes
3. Ethnicity	Explains the relationship between ethnicity and suicidality among adolescents, which factors play an important role in suicidality in adolescents from ethnic minority groups and what to look for when entering into a conversation with a (possibly) suicidal adolescent who belongs to an ethnic minority group in the Netherlands.	5 minutes
4. Recognition of suicidality	Discusses the warning signs associated with suicidality and why is it important to recognize these warning signals.	6 minutes
5. Conversation with the suicidal adolescent	Elaborates the importance of starting a conversation with a suicidal adolescent, how many conversations are needed to estimate the risk for suicide, which essential questions will help in assessing the risk for suicide, which topics should be discussed during the conversation and what the right approach is during the conversation.	8 minutes
6. Conversation with the parents	Explains at what point parents should be contacted, why it is important to involve the parents, how the conversation should be established and what to do when parents refuse to cooperate.	5 minutes
7. Suicide first-aid	Discusses how to provide first aid to a young person who has performed a suicide attempt, how to call for help and what to do while waiting for help.	4 minutes
8. Care and aftercare (for schools)	Elaborates on how the school can contribute to the process of care and aftercare after a suicide (attempt).	9 minutes

*Note*

\* Excluding the four quizzes and four cases at the end of the module



### *Additional information*

Additional information was made available on the website in support of the e-learning modules ordered along four categories each on a separate webpage: films and documentaries, literature, online discussion board and links to related webpages. The films and documentaries page contained five items about adolescent suicide prevention varying from interviews with adolescents who had attempted suicide to suicide survivors and experts. The literature page contained seven papers and reports on youth suicide, seven papers on the relationship between suicide and ethnicity, and four books on youth suicide (two in Dutch and two in English). The online discussion board was created with the main purpose to support and assist participants throughout the program. Participants could communicate with other participants through the online discussion board, or could ask questions or bring in cases with regard to the topic. The main researcher would respond to participant questions within three days after consulting suicide prevention experts if necessary. Lastly, on the links webpage five sections were created (information, education, online help and therapy, ethnicity and survivors), each containing links to informative websites on (adolescent) suicide.

### **Questionnaire**

Participants from the experimental group were asked to complete the self-report evaluation questionnaire immediately after the posttest. The main purpose of this questionnaire was to determine to what extent the gatekeeper was satisfied with different features of the e-learning modules. The questionnaire was composed of 34 questions evaluating characteristics of the modules divided in eight categories: expectation, relevance, design, interaction, cases and quizzes, overall satisfaction, website and final comment. The format of the questionnaire was as follows: four point Likert-scale ( $n= 16$ ), yes/no ( $n= 4$  items), three point Likert-scale ( $n= 3$  items), rating ( $n= 2$ ), multiple choice ( $n=1$  item), multiple responses ( $n= 1$  item) and optional open questions ( $n= 7$ ). On average the questionnaire took 15 minutes to complete. The questionnaire was developed online using Qualtrics, an online survey software. An overview of the question categories, including their format and purpose, is shown in Table 2. In order to present the results coherently, all scores were transformed to the same metric (minimum: 0 and maximum: 1). The optional open questions were excluded from the analyses, and were only included if they provided additional insight to the answers given by the gatekeepers.

Since participants regained access to the website during posttest and follow-up, they were asked during the follow-up assessment whether they had returned to the website to refresh their knowledge after taking the modules. This question provided insight in the knowledge refreshment behavior of the gatekeepers. Moreover, a user track system was built in the website which monitored and collected data on the behavior of the users. As a result

answers given by the participants with regard to how many modules they had followed, which additional information they had consulted and when they had logged into the website were double checked with the data collected with the user track system.

## Results

### Response rate

Four participants assigned to the experimental group were excluded from the study since they did not log on to the website. As a result the second assessment, which included the evaluation questionnaire, was sent to 90 participants in the experimental group of whom 84 completed all the items of the questionnaire (response rate 89.4%). One participant had filled out the questionnaire without following any modules, answers from this participant were excluded from the analyses. The results from the evaluation questionnaire are presented in Table 3. Moreover, since participants were either working within a school setting ( $N = 58$ ) or (youth) mental healthcare setting ( $N = 25$ ), a one-way ANOVA was used to test for perception differences among the two groups of gatekeepers on each feature.

Finally, it should be noted that for the following features only those gatekeepers were included in the analyses that had followed all eight e-learning modules as a total score was calculated based on the eight separately rated modules: expectations, relevance, duration and satisfaction with the entire program.

### Expectations and relevance

The results show that the modules not only met the gatekeepers' expectations well ( $M = 0.89$ ,  $SD = 0.17$ ), but were also considered to be highly relevant ( $M = 0.97$ ,  $SD = 0.09$ ). No differences were found for expectation  $F(1,69) = 0.00$ ,  $p = 0.986$ , and relevance  $F(1,69) = 0.475$ ,  $p = 0.493$  between the groups of participants working in a school- versus those working in a mental healthcare setting.

### Design

All the features related to the design of the e-learning modules were positively evaluated: duration ( $M = 0.88$ ,  $SD = 0.26$ ), user friendliness ( $M = 0.98$ ,  $SD = 0.16$ ), interaction ( $M = 0.94$ ,  $SD = 0.25$ ), contentment with cases ( $M = 0.96$ ,  $SD = 0.10$ ) and quizzes ( $M = 0.95$ ,  $SD = 0.14$ ). In addition, participants were also asked to give an overall grade (1 to 10, converted to 0-1) to evaluate the overall design of the modules. The average grade given to the design was 0.78 ( $SD = 0.09$ ). No differences were found for duration  $F(1,68) = 1.06$ ,  $p = 0.307$ , user friendliness  $F(1,78) = 0.867$ ,  $p = 0.355$ , interaction  $F(1,75) = 0.188$ ,  $p = 0.666$ , contentment with cases

Table 2. Overview of the Evaluation Questionnaire

Characteristic	Format	Question(s)
Expectation and Relevance	Three point Likert-scale (2 items), Optional open question (2 items)	Did the modules meet your expectation(s)? Did you find the content of the modules relevant?
<b>Design</b>		
Duration	Three point Likert-scale (1 item)	What was your opinion about the duration of the modules?
Voice-over	Multiple choice (1 item)	The modules had a voice-over, what are your thoughts about it?
User Friendliness	Four point Likert-scale (1 item), Optional open question (1 item)	To what extent were you satisfied with the user-friendliness of the modules?
Interaction	Four point Likert-scale (1 item), Optional open question (1 item)	To what extent were you satisfied with the level of interaction offered by the modules?
Contentment Cases and Quizzes	Four point Likert-scale (10 item), Optional open question (1 item)	Statements about the number, usefulness, formulation and informativeness of the cases and quizzes (separate questions), and whether the user had sufficient knowledge after following the modules to answer them.
Overall Design	Rating (1 item)	Rate the design (duration, layout and user-friendliness) of the modules with a number between 1 and 10.
Overall Satisfaction	Rating (1 item), Optional open question (1 items)	Rate the modules with a number between 1 and 10.
Usefulness	Four point Likert-scale (4 items)	After following the modules I: gained knowledge about adolescent suicidality (1), gained self-confidence (2) / skills (3) when interacting with a suicidal adolescent. I recommend other gatekeepers to follow these modules (4).
Additional Information	Yes/no (4 items), Multiple responses (1 item)	Did you use: the films and documentaries (1), literature (2), online discussion board (3), the links to other websites (4)? Which of the additional information available on the website did you found useful?
Final Comment	Optional open question (1 item)	Descriptive

$F(1,81) = 0.530, p = 0.469$ , and quizzes  $F(1,81) = 0.043, p = 0.836$  between the two groups of participants.

With regard to the voice-over, 51% of the participants stated to have appreciated the voice-over, 27% followed the modules without turning the voice-over on and 10% mentioned that the voice-over did not contribute to the content of the e-learning modules. The remaining 14% chose 'otherwise' and elaborated their answer. The majority mentioned that they weren't satisfied with the voice-over because of the low speed in which the narrator was talking or encountered technical difficulties in turning on the voice-over. With regard to the latter, it was noted on the website that the page should be refreshed if the voice-over doesn't start automatically. The technical difficulties were mainly related to this issue or the fact that many organizations did not support the use of sound.

### **Overall satisfaction**

Each module was evaluated with an average grade between 0.75 and 0.79. The mean of the sum score of the eight e-learning modules was 0.73 (SD = 0.15). No difference was found for overall satisfaction  $F(1,81) = 0.238, p = 0.627$  between the two group of participants.

### **Usefulness**

Participants in this study believed that the modules contributed to gain in knowledge ( $M = 0.93, SD = 0.26$ ), enhancement in self-confidence ( $M = 0.78, SD = 0.42$ ), and improvements in skills ( $M = 0.72, SD = 0.45$ ) and they would recommend the modules to other gatekeepers ( $M = 0.93, SD = 0.26$ ). No differences were found between the two groups for knowledge gain  $F(1,81) = 0.031, p = 0.861$ , enhancement in self-confidence  $F(1,81) = 0.110, p = 0.741$  or recommendation to others  $F(1,81) = 0.031, p = 0.861$ . However, the evaluation of skills improvement differed significantly between the two groups,  $F(1,81) = 7.872, p = 0.006$ , indicating that gatekeepers working in a school setting believed to have improved more in skills after following the modules compared to those gatekeepers working in a (youth) mental healthcare setting.

### **Amount of modules followed**

Although following all the modules was not obligatory for the participants, 86% of the gatekeepers did complete all eight modules.

**Table 3.** Mean Scores and Standard Deviations of Expectations and Relevance, Design, Overall Satisfaction and Usefulness

	N <sup>1</sup>	M (SD) <sup>2</sup>
<b>Expectations and relevance</b>		
Expectations	71	0.89 (0.17) <sup>2</sup>
Relevance	71	0.97 (0.09) <sup>2</sup>
Design		
Duration	70	0.88 (0.26) <sup>2</sup>
User friendliness	80	0.98 (0.16)
Interaction	77	0.94 (0.25)
Contentment cases	83	0.96 (0.10)
Contentment quizzes	83	0.95 (0.14)
Overall design	83	0.78 (0.09)
<b>Overall satisfaction</b>		
Suicidality among adolescents	83	0.78 ( 0.11)
Risk factors	83	0.79 ( 0.11)
Ethnicity	83	0.74 ( 0.13)
Recognition of suicidality	81	0.79 ( 0.11)
Conversation with the suicidal adolescents	77	0.77 ( 0.11)
Conversation with the parents	75	0.75 ( 0.11)
Suicide first-aid	74	0.77 (0.12)
Care and aftercare	71	0.77 ( 0.11)
Entire program (Module 1 – 8 )	71	0.73 (0.15)
<b>Usefulness – statements</b>		
Knowledge gain	83	0.93 (0.26)
Confidence enhancement	83	0.78 (0.41)
Skills improvements	83	0.72 (0.45)
Recommend to other gatekeepers	83	0.93 (0.26)

*Note*

<sup>1</sup>Participants who chose the answer category 'other' have been excluded, <sup>2</sup>Mean and SD of the sum score of all the eight modules for which only participants were included who had followed all eight e-learning modules.

**Additional information**

To get an insight into the use of the additional information available on the website, gatekeepers were asked whether they had used the supplementary material on the website. The online discussion board was only used by 4% of the participants. During the study only four participants posted a question on the discussion board (related to role of social media, effective

interventions, self-help group for survivors and age requirements with regard to informing parents). One fifth of the participants used the available literature (22%) and the links available on the website (28%). However, approximately half of the gatekeepers (47%) had watched the films and documentaries on the website during the course of the study.

### **Knowledge refreshment**

Gatekeepers from the experimental group gained access to the website during posttest and follow-up to refresh their knowledge. At follow-up participants were asked whether they had returned to the website of whom 16 (19.8%) did. Of these, nine returned for the modules and the additional information, four only for the e-learning modules and the remaining three only for the additional information.

### **Final comments**

The final item on the questionnaire was an optional open question which gave participants the opportunity to give their final comments, of whom 26 responded to this question. The answers were diverse, but the following answers were given by more than one participant: allow participants to access the content of the modules after the trial has been completed ( $n=5$ ), perform the evaluation immediately after completion of modules for accurate feedback ( $n=3$ ), and hopefully other gatekeepers will follow the modules as well ( $n=2$ ).

### **Discussion**

This paper presented the construction of MHO adolescent suicide prevention e-learning modules designed for gatekeepers, and presented the results of an evaluation of these modules by participants of a study on their effectiveness. The overall aim of the modules was to transfer information on adolescent suicide prevention to gatekeepers working in school- and mental healthcare settings through e-learning modules. Two learning models, the objectivist and the constructivist model (Jonassen, 1991; Schell, & Janicki, 2013; Tham et al., 2005), were combined in order to develop the modules resulting in a lecture format using a PowerPoint presentation which was under full control by the user. The modules were created with extremely limited resources and contained features as text, voice-over, cases and quizzes. Moreover, the modules were embedded into a website which contained additional information (literature, films and documentaries, links to other relevant website and online discussion board).

In order to evaluate the modules gatekeepers were asked to appraise the modules on expectation and relevancy, design and enhancement, usefulness and recommendation. The findings of this study showed that the modules met the expectations of the gatekeepers and

were perceived to be highly relevant. In addition gatekeepers were satisfied with the design of the modules and the incorporated features (duration, user friendliness, interaction, cases and quizzes). However, the results with regard to the voice-over were mixed. Although half of the participants found this feature to be useful, the remaining half did not use the voice-over or was not satisfied with the current state of the voice-over which had either to do with the low speed of the narrator or technical difficulties when turning the voice-over on. With regard to the usefulness of the modules, gatekeepers believed that modules improved their knowledge, self-confidence and skills on the topic of adolescent suicide prevention, and would recommend the modules to other gatekeepers. An interesting finding was that gatekeepers working in a school setting believed to have improved more in skills after following the modules compared to those gatekeepers working in a (youth) mental healthcare setting.

Furthermore, this study also aimed to get an insight in the learning behavior of the users in an online environment. The results showed that even though following the modules was not obligatory almost all gatekeepers did complete all eight modules, and that the additional information made available online alongside the modules was not used by many participants. An exception was the films and documentaries section which was visited by approximately half of the gatekeepers. Moreover, a very small percentage of the gatekeepers returned to the website to refresh their knowledge during the three month follow-up.

Based on the findings of this study we suggest the following recommendations to researchers and organizations planning on developing e-learning modules. First, we recommend other researchers to consider developing e-learning modules themselves for research purposes instead of spending a lot of money for modules that need yet to be tested on their effectiveness and user's satisfaction. The experiences with the development of the MHO modules, and their demonstrated effects show that good subject knowledge allows effective modules to be developed by researchers rather than specialist organizations or companies. The modules, if found effective, can always be upgraded afterwards. Second, given the feedback from the users it is expected that a professional narrator could improve the value of the voice-over. Moreover, we advise to use software that doesn't require additional manuals and information for the users as many will skip reading them. For example, some of the technical difficulties participants faced with the voice-over could have been solved if they had read the additional page about the possible technical difficulties and their solutions available on the website. Thirdly, in line with the second recommendation, additional information in support of the modules provided on a different segment on the website was not used by many gatekeepers. The only segment that was visited by almost half of the participants was the films and documentaries page which could indicate that gatekeepers were interested in visual information alongside text. Therefore, we recommend incorporation of visual material into the modules. Lastly, we advise

other researchers and developers to distinguish between different groups of professionals when developing e-learning modules based on the profession of the gatekeepers as those working in a school setting reported to have profited more from the program than those working in a (youth) mental health related setting.

The main limitation of this study is that the self-report evaluation questionnaire was not filled out by the participants immediately after following the e-learning modules. The questionnaire was sent to the participants one week after participants had access to the website. This might have affected the reliability of the participant's answers as was pointed out by a very small percentage of the participants. Another limitation was the use of optional open questions which, if responded by the participants, led to diverse answers which are difficult to categorize and integrate in further development of the program. Lastly, the group comparison analyses were made despite relatively small sample sizes, in particular in one of the two groups.

## **Conclusion**

The combined findings from this study and the randomized study on the effectiveness of the modules reported elsewhere suggest that the use of e-learning modules is not only an effective method to teach gatekeepers in adolescent suicide prevention, but is also considered to be a satisfactory technique for gatekeepers. Moreover, the modules were created with limited resources which also indicates that they are likely cost-effective compared to the more traditional ways of teaching. Nevertheless, future research in this area is needed in support of the findings of this study and to build forward in this particular field of preventive intervention.



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