Using the Musical Multimedia Tool ACMUS with People with Severe Mental Disorders: A Pilot Study

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ABSTRACT
Music therapy could be an interesting resource to enhance social and cognitive skills in people with mental disorders. The aim of this study is to assess if using the music multimedia tool ACMUS with people with severe mental disorders is feasible and potentially beneficial. The study was a prospective pilot trial with 12 patients who had a diagnosis of schizophrenia or related disorders. It was carried out along nine sessions in small groups. The evaluation tools used were the observational COTE (Comprehensive Occupational Therapy Evaluation) scale, and a satisfaction questionnaire that was completed by the participants. Results showed an improvement in the COTE scores between the first and last session. Results of the satisfaction questionnaire were also positive, as the therapy program was positively rated by the patients. Programs which use the multimedia tool ACMUS for musical therapy sessions for patients with severe mental disorders are feasible and of clinical interest for future research.

Author Keywords
Music, serious games, schizophrenia, mental health, occupational therapy.

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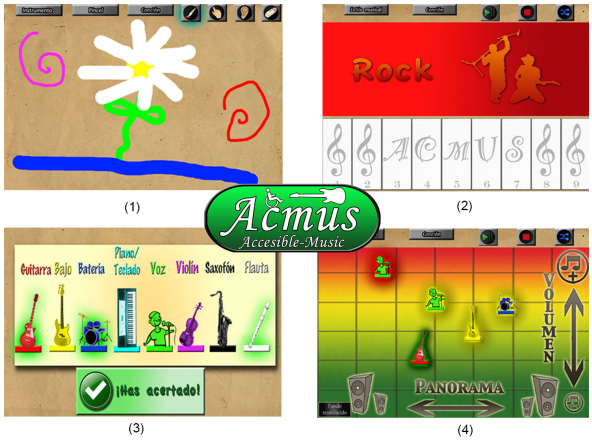

Figure 1. ACMUS activities: (1) The composition Workshop (painting while creating music) (2) The musical Scene (improvisation in many musical styles) (3) The Conductor (recognizing musical instruments) (4) The Mixing Studio (mixing music like in a record studio)

INTRODUCTION
Using music as a therapy resource has shown positive results in diverse fields: autism [6], learning disorders [12], developmental disability [5], oncology [16] or mental health [15]. A systematic review stated that there was preliminary evidence of benefit for music therapy in patients with psychiatric pathology in in domains that included anxiety, depression, stress, anger control, social abilities, group cohesion or personal communication [3]. The inclusion of multimedia technology in interventions with psychiatric patients is an growing trend but is not as common in music therapy [8]. The aim of this study is to assess if using ACMUS, a tool that adds a graphic dimension to music [11, 10], in patients with severe mental disorders has a therapeutic interest.

METHODS

Participants

Participants included 12 individuals in residential services for people with severe mental disorders. They were selected by occupational therapists. The eight men and four women in the study were diagnosed with schizophrenia (n=9) or related disorders. The mean age was 58.8 years old (standard deviation; SD;: 8.6) an the mean time since diagnosis was 33.6 years (SD 8.6).

The tool: ACMUS (Accessible Music)

ACMUS is a music multimedia tool that aims to create an accessible interaction with music through visual elements and technology [11, 10]. It has four activities that deal with different musical areas (see Figure 1). The *Composition workshop* consists on creating music while drawing (the colour and thickness of the lines are connected with the timbre and the volume of the music). In the *Musical Scene*, users improvise melodies with a nine-key piano on top of a musical base. There are many musical styles and the activity adapts the available notes and the musical accompaniment to each style. The *Conductor* focuses on recognizing musical instruments that sound alone or in groups of two or three. Finally, the *Mixing studio* makes possible to mix real songs by modifying the volume and panorama of the different tracks, whichare represented with instrument icons. Moving these icons vertically changes the track volume and moving them horizontally changes the panorama.

Intervention and interaction system

The intervention aimed to improve cognitive, social and manipulative skills through music. Participants (divided in four subgroups) received nine sessions of 30 minutes during a month.

The system used an interactive whiteboard (based on the *Wiimote Whiteboard* project with the software of Johnny Chung Lee [13, 14] coupled with a projector, a bluetooth wireless remote controller for the Nintendo Wii and an special pen that emitted infrared light (see Figure 2).

Evaluation and statistical analysis

The observational scale COTE (Comprehensive Occupational Therapy Evaluation) [2] was used in its Spanish version [1] during each session. This instrument assesses cognitive, social and manipulative skills and lower scores indicate a better performance. Participants also filled a satisfaction questionnaire. COTE scores of the first and last sessions were compared with a Wilcoxon signed-rank test for paired samples. The statistical software was SPSS 21 (IBM, Armonk, NY, EEUU) and results were considered statistically significant if $p<0.05$.

RESULTS

There were significant differences between the initial COTE scores (mean 9 points, SD 6.2) and the final COTE scores (mean 0.83, SD 0.99) with $p = 0.002$. Regarding the satisfaction questionnaire, sessions were positively rated (4.64 out of 5 points). Besides, most participants said that they wanted to use ACMUS in the future (55% said "yes" and 45% said "probably"). Finally, most participants found ACMUS easy (45%) or of average difficulty (45%) to use. Therapists also assessed the tool positively.

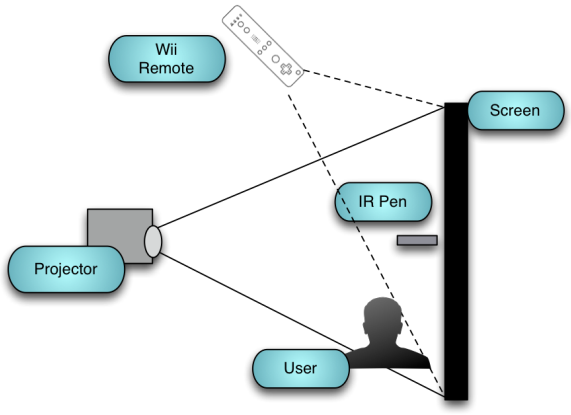

Figure 2. Interactive whiteboard set [13, 14]

DISCUSSION

Music therapy could have therapeutic effects in patients with psychiatric disorders [7, 4, 9]. However, the use of multimedia tools in this field is not common. ACMUS combines active (composition and improvisation) with passive techniques (listening). Although the role of the therapist is necessary, participants have much room for initiative and creativity.

The main limitations of our study are the sample size and the absence of a control group. However, results are preliminary evidence for the potential effectiveness of ACMUS in these contexts. Moreover, participants were satisfied with the sessions. ACMUS is an accessible and easy to use tool that can be used in a group context with interactive blackboards (as in our study) but also in individual contexts with tablets (with a more personalized use).

In conclusion, this multimedia tool is an innovative resource in music therapy. Future research with more robust designs could assess the effect of similar interventions in patients with mental disorders.

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