Learning Beyond the Game: A Multimodal Analysis of Rocksmith Users' Interactions

Ruben C. Rodriguez, Vittorio Marone

Ruben C. Rodriguez, Ph.D.
San Antonio College
Music Business Program – Department of Radio,
Television, and Broadcast
1819 N. Main Ave.
782 12 San Antonio, Texas
UNITED STATES OF AMERICA
rrodriguez384@alamo.edu

Ruben C. Rodriguez is Program Coordinator and Faculty for the Music Business Program in the Department of Radio, Television, and Broadcast at San Antonio College in San Antonio Texas, U.S.A. He received his Ph.D. in Interdisciplinary Learning and Teaching with a cognate in Instructional Technology from the University of Texas at San Antonio where he also received his Master of Arts in the same concentration. He also holds his bachelor's degree in Music from The University of Texas at San Antonio and has his Associates in Radio, Television, and Film from San Antonio College where he currently teaches. His research interests include technology use in higher education, online learning, music learning through technology, learning with digital games, and social justice. Ruben Rodriguez has published in scholarly academic journals and presented papers at several regional and national conferences to include invitations as a guest panelist.

Vittorio Marone, Ph.D.
The University of Texas at San Antonio
College of Education and Human Development
Department of Interdisciplinary Learning and Teaching
One UTSA Circle
782 49 San Antonio, Texas
UNITED STATES OF AMERICA
vittorio.marone@utsa.edu

Vittorio Marone is an Associate Professor and the Coordinator of the Instructional Technology Program in the Department of Interdisciplinary Learning and Teaching at The University of Texas at San Antonio. He earned his doctorate in Education in a dual-degree program between the University of Padua and The University of Tennessee. He also holds a doctorate in Languages, Cultures, and Societies from Ca' Foscari University of Venice. His research interests include youth cultures, humour, and affinity spaces. He presented his work at national and international conferences such as AERA (American Educational Research Association), APME (Association for Popular Music Education), and G4C (Games for Change).

ABSTRACT:

In the context of games for learning, rich multimodal conversations online can contribute to extending the educational potential of digital games. In this study, we analyzed the multimodal features of user interactions in an online affinity space dedicated to the Rocksmith digital game. This game allows users to connect a traditional electric guitar to a Sony PlayStation 4 console and interact with the game while improving their guitar playing skills. Findings show that users include several multimodal elements in their online conversations in order to support guitar learning beyond the digital walls of the game. Emoticons, emoji, pictures, YouTube videos, and user-generated videos are all part of a constellation of audiovisual modes that support social learning practices in an interest-driven online space. By understanding how users incorporate these modes in their interactions, game designers, game developers, and educators can make informed decisions on how to design and improve these features within the games themselves and in online communities of learning dedicated to such games. The findings of this study can also help these stakeholders and decision-makers create more engaging and more effective connections between games and online platforms.

KEY WORDS:

affinity spaces, games and learning, multimodality, online learning, Rocksmith.

Introduction

For centuries, learning to play a musical instrument has been tied to formal music education, which is widely based on face-to-face instruction. Even today, face-to-face lessons are a significant component of formal music education programs within traditional four-year universities and community colleges. In-presence one-on-one lessons are also common outside of traditional school settings, such as local music stores or a music teacher's home.[1] Given the steady advancement in technology, the concept of learning to play a musical instrument has allowed alternative avenues for music learning.[2] In this context, the video game industry has developed digital games that offer music learners a playful platform for music learning that includes input devices modeled after digital musical instruments, music-based games, and related online communities.[3] Moreover, these playful platforms provide unique opportunities for interactive teaching and learning.[4]

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1   DAMMERS, R. J.: Utilizing Internet-based videoconferencing for instrumental music lessons. In *Update: Applications of Research in Music Education*, 2009, Vol. 28, No. 1, p. 18.; JENKINS, P.: Formal and informal music educational practices. In *Philosophy of Music Education Review*, 2011, Vol. 19, No. 2, p. 189.

2   DAMMERS, R. J.: Utilizing Internet-based videoconferencing for instrumental music lessons. In *Update: Applications of Research in Music Education*, 2009, Vol. 28, No. 1, p. 18.; JENSON, J. et al.: So you think you can play: An exploratory study of music video games. In *Journal of Music, Technology & Education*, 2016, Vol. 9, No. 3, p. 274.

3   GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 67.

4   ARNSETH, H. C.: Learning to play or playing to learn: A critical account of the models of communication informing educational research on computer gameplay. In *Game Studies*, 2006, Vol. 6, No. 1. [online]. [2020-11-09]. Available at: <http://gamestudies.org/06010601/articles/arnseth>.

In the context of guitar-related games,[5] some of the most notable are (in order of release):

1. *Guitar Hero*;[6]
2. *Rock Band*;[7]
3. *Rocksmith.*[8]

These guitar games engage the player through both their interactive features and their ability to model facets of the musical instrument.[9] Due to the fact that the first two games in the list (Guitar Hero and Rock Band) both use controllers that only vaguely resemble a guitar, the transferability of what is learned from the game to the traditional electric guitar is not necessarily relevant.[10] Even if one would consider these controllers as 'musical instruments', they still do not reflect the functional characteristics of a traditional electric guitar (e.g., they lack strings). Rocksmith, on the other hand, allows players to use a traditional electric guitar in lieu of a plastic controller equipped with levers and buttons to interact with the game, thus providing a more authentic learning experience.[11] Considering that these tools are relatively new, research on how people learn to play guitar through technology is limited.[12] Furthermore, the learning that takes place within digital games is often complemented and enriched by online communities that serve as a space for learners to communicate, share, and collaborate.[13] In this context, J. P. Gee[14] defines 'affinity spaces' as informal places in which people interact, socialize, and learn together because of a common interest or passion. This study focuses on how people interact and learn to play guitar by using Rocksmith with the support of multimodal communication in an affinity space, namely the official Ubisoft (the developer of the game) online discussion forum. Specifically, through a multimodal analysis, the study will attempt to answer the following research question: What multimodal resources do people use when they interact about learning to play the guitar with the Rocksmith digital game in an online affinity space?

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5   GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 67.

6   HARMONIX et al.: *Guitar Hero (series)*. [digital game]. Mountain View : RedOctane et al., 2005-2015.

7   HARMONIX: *Rock Band (series)*. [digital game]. New York : MTV Games et al., 2007-2017.

8   UBISOFT SAN FRANCISCO: *Rocksmith*. [digital game]. Montreuil : Ubisoft, 2011.

9   ARSENAULT, D.: Guitar Hero: Not like playing guitar at all?. In *Loading...*, 2008, Vol. 2, No. 2, p. 3.; GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 67.

10 APPLEGATE, M. C.: Redesigning the familiar: How effective are directional control pads in developing musicianship in 8- to 12-year-old children?. In KING, A., HIMONIDES, E. (eds.): *Music, technology, and education: Critical perspectives*. London : Routledge, 2016, p. 108-109.; ARSENAULT, D.: Guitar Hero: Not like playing guitar at all?. In *Loading...*, 2008, Vol. 2, No. 2, p. 4.; GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 66.

11 ARSENAULT, D.: Guitar Hero: Not like playing guitar at all?. In *Loading...*, 2008, Vol. 2, No. 2, p. 2.; GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 67.

12 ARSENAULT, D.: Guitar Hero: Not like playing guitar at all?. In *Loading...*, 2008, Vol. 2, No. 2, p. 6.

13 GEE, J. P.: *Situated language and learning: A critique of traditional schooling*. New York : Routledge, 2004, p. 71.; GEE, J. P.: Semiotic social spaces and affinity spaces: From the age of mythology to today's schools. In BARTON, D., TUSTING, K. (eds.): *Beyond communities of practice: Language, power and social context*. Cambridge : Cambridge University Press, 2005, p. 214-215.; GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 78.

14 GEE, J. P.: *Situated language and learning: A critique of traditional schooling*. New York : Routledge, 2004, p. 75-76.; GEE, J. P.: Semiotic social spaces and affinity spaces: From the age of mythology to today's schools. In BARTON, D., TUSTING, K. (eds.): *Beyond communities of practice: Language, power and social context*. Cambridge : Cambridge University Press, 2005, p. 223.

Methodology

Multimodal analysis is a methodological approach that draws on the multiplicity of modes of human communication.[15] It considers multiple ways people communicate and interact with one another, such as gestures, body language, sounds, music, and space. C. Jewitt, J. Bezemer, and K. O'Halloran[16] argue that there are three key premises of multimodality:

1. Meaning is made with multiple semiotic resources (materials, actions, and artifacts we use for communicative purposes), each one offering distinct limitations and potentialities.
2. Meaning making involves the production of multimodal wholes (how different kinds of meaning making tools are connected; for example: image with writing, speech with gesture).
3. It is important to attend to all semiotic resources (social, cultural, or material resource) being used to communicate.

Furthermore, according to C. Jewitt,[17] the theoretical assumptions of multimodality and multimodal analysis are:

1. Language is part of a multimodal ensemble assuming that communication and representation draw upon a multiplicity of modes that all contribute to meaning making.
2. Each mode within the ensemble is understood to realize different communicative work that is socially shaped over time and contributes to meaning making. Modes are shaped through historical, cultural, and social uses to realize social functions.
3. People's interests and motivations within a certain social context influence the meanings of multimodal semiotic signs.

From these perspectives, multimodality deals with and at the same time questions the 'division of labour' regarding meaning making.[18] It does this assuming that different means for meaning making often appear together. For example, "speech with gesture, image with writing, and math symbols with writing"[19] can take place at the same time. These modes concurrently contribute to meaning making, and often complement one another.[20] C. Jewitt and G. Kress agree that multimodal analysis is appropriate for interdisciplinary research because of its flexibility for the collection and analysis of multimodal and digital data that occur naturally.[21] For example, some of the data suitable for a multimodal analysis include closed circuit television (CCTV) recordings, visuals on a digital display, or logs from online games. A few examples of studies that utilized multimodal analysis include course activities on the online social networking site Pinterest,[22] technology-mediated

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15   JEWITT, C.: *The Routledge handbook of multimodal analysis.* 2nd Edition. London : Routledge, 2014, p. 14.; KRESS, G.: *Literacy in the new media age.* New York : Routledge, 2003, p. 37.; KRESS, G.: *Multimodality: A social semiotic approach to contemporary communication.* London : Routledge, 2010, p. 5.

16   JEWITT, C., BEZEMER, J., O'HALLORAN, K.: *Introducing multimodality.* New York : Routledge, 2016, p. 3.

17   JEWITT, C.: *The Routledge handbook of multimodal analysis..* London : Routledge, 2014, p. 15-17.

18   JEWITT, C., BEZEMER, J., O'HALLORAN, K.: *Introducing multimodality.* New York : Routledge, 2016, p. 4.

19   Ibidem, p. 2.

20   BEZEMER, J., MAVERS, D.: Multimodal transcription as academic practice: A social semiotic perspective. In *International Journal of Social Research Methodology,* 2011, Vol. 14, No. 3, p. 191-192.

21   JEWITT, C.: *The Routledge handbook of multimodal analysis.* London : Routledge, 2014, p. 14-17.; KRESS, G.: *Multimodality: A social semiotic approach to contemporary communication.* London : Routledge, 2010, p. 5-6.

22   SONG, K. et al.: Students as pinners: A multimodal analysis of a course activity involving curation on a social networking site. In *The Internet and Higher Education,* 2017, Vol. 33, No. 2, p. 39. [online]. Available at: <https://doi.org/10.1016/j.iheduc.2017.01.002>.

learning on Facebook,[23] online authoring and engagement with digital spaces,[24] and educational math games.[25] In the context of digital games, multimodal analysis has been used to examine social interactions of students within the autism spectrum disorder (ASD) within the online multiplayer game Minecraft.[26] On-screen data generated by students were analyzed through repeated viewing and listening sessions. The coding of collected data was organized by multimodal features and themes that included "written/visual, visual-images, gestural-virtual, oral-speech, gestural-physical, written text, gestural-virtual and physical, visual-image, gestural-virtual, and oral-speech".[27] Multimodal analysis as a method fits the context of this study in that it supports the collection and analysis of digital data in an online environment. Multimodal data can be stored and analyzed on a single platform, through the use of Computer Assisted Qualitative Data Analysis Software (CAQDAS), such as *Nvivo*.[28] Nvivo supports different data formats, including PDF files, Excel files, researcher notes, multimedia, images, websites and content from social media such as Facebook, Twitter, and YouTube. Considering its extensive use in qualitative research and multimodal studies, Nvivo was selected as a digital tool for collecting and analyzing data in this study.

Data Collection and Analysis

Using Nvivo's NCapture tool, (a) videos, (b) images, (c) graphics, (d) emojis, and (e) emoticons from the Ubisoft discussion forum dedicated to Rocksmith were collected, coded, managed, and stored in appropriate nodes (storage bins for data). Only threads that explicitly focused on learning the guitar were selected for the analysis. These threads included a total of 784 posts, which represents the sample size and all the posts analyzed in this study. The coding process involved placing multimodal data within top level nodes during the collection phase and then coding them according to the multimodal criteria and steps described below:[29]

1. Mode (Step 1: data examined and appropriately categorized into modes).
2. Semiotic Resource (Step 2: connections to meaning making first coded by sign or symbol type).
3. Modal Affordance or "Meaning Potential" (Step 3: categorize by what image/resource is "best" for and what words, and what other modes/arrangements are "best" for in a particular context).

23   BARDEN, O.: Winking at Facebook: Capturing digitally mediated classroom learning. In *E-Learning and Digital Media*, 2014, Vol. 11, No. 6, p. 554.
24   HANSFORD, D., ADLINGTON, R.: Digital spaces and young people's online authoring: Challenges for teachers. In *Australian Journal of Language and Literacy*, 2009, Vol. 32, No. 1, p. 1.
25   DERBOVEN, J. et al.: Playing educational math games at home: The Monkey Tales case. In *Entertainment Computing*, 2016, Vol. 16, No. 1, p. 2-3.
26   STONE, B. G., MILLS, K. A., SAGGERS, B.: Online multiplayer games for the social interactions of children with autism spectrum disorder: A resource for inclusive education. In *International Journal of Inclusive Education*, 2019, Vol. 23, No. 2, p. 209-210.
27   Ibidem, p. 214.
28   ANTONIADOU, V.: Collecting, organizing and analyzing multimodal data sets: The contributions of CAQDAS. In MOORE, E., DOOLY, M. (eds.): *Qualitative approaches to research on plurilingual education*. Dublin, Voillans : Research-publishing.net, 2017, p. 440.
29   JEWITT, C.: *The Routledge handbook of multimodal analysis.* 2nd Edition. London : Routledge, 2014, p. 14-17.; JEWITT, C., PRICE, S.: Multimodal approaches to video analysis of digital learning environments. In *Proceedings of BCS HCI 2012 Workshops: Video Analysis Techniques for Human-Computer Interaction.* Birmingham : BISL, 2012, p. 2-3. [online]. [2020-11-11]. Available at: <https://www.scienceopen.com/document_file/e4453aee-043d-413f-843c-eb9b7ee14798/ScienceOpen/001_Jewitt.pdf>.; KRESS, G.: *Multimodality: a social semiotic approach to contemporary communication.* London : Routledge, 2010, p. 5-8.

4. Intersemiotic Relationships (Step 4: relationships between modes appropriately coded into separate nodes/categories displaying the relationship type).

Employing these steps and criteria allowed for a structured coding process and assisted with making sense of the data (meanings, relationships, and emerging themes). Images and videos embedded or posted as external URLs within the collected posts were analyzed according to the procedure described by C. Jewitt and S. Price:[30]

1. Collecting and logging data (log and descriptive synopsis of each thread).
2. Viewing data (videos viewed multiple times, second by second analysis; audio listened to multiple times; images viewed multiple times in detail).
3. Sampling data (video and audio excerpts of significance to the research questions time stamped and categorized).
4. Transcribing and analyzing data (data categorized by their corresponding modes).

Data excerpts presented below are cited employing the method used by Marone[31] and are numbered sequentially in braces labelled as:

{sequential number of the excerpt in the chapter} [year-month-day of the post-(unique number assigned to the thread/position of the post in the thread)-nickname of the user]

For example:

{01} [2017-03-11-(01/01)-Staree69]

Shorter excerpts are presented within the text in double quotation marks. Examples of multimodal data are presented as figures. All data excerpts presented in this study are cited verbatim, as they appear in the discussion forum, without corrections. To protect the confidentiality and anonymity of the users of the discussion forum, their usernames have been substituted with second level nicknames (pseudonyms).

Findings

The analysis of the posts collected from the official Ubisoft discussion forum shows an extensive use of multimodal communication. The first cycle of coding (initial codes and categories) included: emoticon types; emoji types; artist pictures; modified pictures; guitar products; YouTube videos; video links; Twitch links; and user created videos. The second cycle of coding narrowed down the categories to: emoticons; emojis; pictures; graphics; and videos. Finally, data were categorized into two main themes: iconic resources; and audio-visual resources. This coding and theme-generating process is displayed in Table 1.

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30   JEWITT, C., PRICE, S.: Multimodal approaches to video analysis of digital learning environments. In *Proceedings of BCS HCI 2012 Workshops*: *Video Analysis Techniques for Human-Computer Interaction*. Birmingham : BISL, 2012, p. 2-3. [online]. [2020-11-11]. Available at: <https://www.scienceopen.com/document_file/e4453aee-043d-413f-843c-eb9b7ee14798/ScienceOpen/001_Jewitt.pdf>.
31   MARONE, V.: Online humour as a community-building cushioning glue. In *The European Journal of Humour Research*, 2015, Vol. 3, No. 1, p. 65.

Table 1: Coding of Multimodal Data

1st Cycle of Coding	2nd Cycle of Coding	Theme
• Punctuation smiley • Persevering face • Smiley • Grinning face • Winking grinning face • Face savoring food • Frowning face • Grinning face with sunglasses • Pouting face • Question face • Neutral face • Rolling eyes smiley	Emoticons Emojis	Iconic resources
• Artist pictures • Modified pictures • Guitar products • *YouTube* videos • Video links • Twitch links • User created video	Pictures Graphics Videos	Audiovisual resources

Source: own processing

The analysis of the posts displayed the following forms of multimodal communication: (1) the use of emoticons and emojis as a way of communication and expression; (2) embedded pictures, charts, and graphics used to display concepts related to learning to play the guitar; (3) the use of embedded videos, web pages, and pictures; and (4) user-generated videos that demonstrate guitar techniques.

Iconic Resources: Emoticons and Emojis

In his book, M. Danesi[32] places emoticons and emojis into descriptive categories: (1) the visual (representing image); (2) the meaning (what the image is representing); and (3) the function (what the image is conveying). Accordingly, emoticons and emojis found in the analyzed data were identified and categorized as: (1) Emoticon/Emoji (visual used in the post); (2) meaning (what it means); and (3) function (what it is doing), as illustrated in Tables 2 and 3. The analysis of collected data shows the use of both emoticons and emojis as a form of meta-linguistic communication through which users expressed themselves in their posts. In previous studies, H. Alshenqeeti and M. Danesi distinguish between what is considered an emoticon and what is considered an emoji. Emoticons, more formally known as ASCII (American Standard Code for Information Interchange) emoticons, are visual representations solely constructed from keyboard characters and/or punctuation marks that resemble facial expressions and have been widely used in emails and websites. An emoji differs from an emoticon because it is an actual image instead of a symbol constructed from keyboard characters and punctuation

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32   DANESI, M.: *The semiotics of emoji: The rise of visual language in the age of the Internet*. London : Bloomsbury Publishing, 2016, p. 60.

marks.[33] Created around 1998, the term emoji means a 'picture word' and is an English version of the Japanese word 絵文字, with the 'e' of emoji standing for 'picture' and 'moji' meaning 'letter' or 'character'. The term 'emoji' can be both singular and plural in English, but is commonly pluralized as 'emojis'.[34] Within the analyzed posts, emoticons were used to express a user's emotion following a brief phrase or statement, often posted in response to another user's post. There were two emoticons found in the data set: a punctuation smiley and a persevering face, as shown in Table 2, which also presents M. Danesi's descriptions of the emoticons' meaning and function.[35]

Table 2: Meaning and Function of Emoticons in the Analyzed Data

Emoticon	Meaning	Function	Occurrences	Percentage
:)	Punctuation smiley	Used to convey happiness, joy, or humour	7	87%
>.<	Persevering face	Used to convey skepticism, undecidedness, uneasiness, or being hesitant	1	13%
Total			**8**	**100%**

Source: own processing

The following example shows how a user employed a smiley emoticon as a humourous remark in response to another user in the discussion forum:

{25} [2018-01-10-(10/01)-DerBahHaus]
That's not so long. Is it? :)

Another example of emoticon use within the analyzed posts conveys a completely different meaning by beginning with what could be considered a vulgar acronym followed by an emoticon of a persevering face:

{26} [2017-01-04-(11/01)-PrinceDooKu]
fml if I know >.<

In this context, the use of the persevering face emoticon reinforces emotions of uneasiness, skepticism, and effort of some sort. This was the only occurrence of this emoticon within the analyzed data. Similar to emoticons, but more widely used, the next set of examples displays the uses and functions of emojis in conversations that took place in the discussion forum. The extended use of emojis, if compared to emoticons, may be due to an automatic function of the software that transforms traditional emoticon punctuation into colourful emojis, which is common on social media and discussion forums. The meanings and functions of the emojis[36] found in the analyzed data are presented in Table 3, including their occurrences and percentages.

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33   ALSHENQEETI, H.: Are emojis creating a new or old visual language for new generations? A socio-semiotic study. In *Advances in Language and Literary Studies*, 2016, Vol. 7, No. 6, p. 56.; DANESI, M.: *The semiotics of emoji: The rise of visual language in the age of the Internet*. London : Bloomsbury Publishing, 2016, p. 60-61.
34   DANESI, M.: *The semiotics of emoji: The rise of visual language in the age of the Internet*. London : Bloomsbury Publishing, 2016, p. 66.
35   DANESI, M.: *The semiotics of emoji: The rise of visual language in the age of the Internet*. London : Bloomsbury Publishing, 2016, p. 68.
36   Ibidem, p. 23-24.

Table 3: Meanings and Functions of Emojis in the Analyzed Data

Emoji	Meaning	Function	Occurrences	Percentage
	Smiley	Used to convey positive feelings, support, empathy, happiness, or joy	93	43%
	Grinning face	Used to convey good cheer, general pleasure, or humour	62	29%
	Winking grinning face	Can signals a joke, flirtation, hidden meaning, or positivity through playful, suggestive, or ironic tones	62	29%
	Face savoring food	Used to convey that food is delicious or express that a person is attractive (may also be used to convey effort)	12	6%
	Frowning face	Conveys feelings of disappointment, affectionate sadness, or moderate concern	11	5%
	Grinning face with sunglasses	Used to convey "coolness" or a sense of composure or aplomb	4	2%
	Pouting face	Used to convey anger or aggression, with the colour red bearing the strength of these emotions	4	2%
	Question face	Used to convey a question or confusion	4	2%
	Neutral face	Often used to depict a neutral sentiment, mild irritation, a deadpan sense of humour, or concern	2	1%
	Rolling eyes smiley	Commonly represents the process of thinking, boredom, or confusion	2	1%
Total			**214**	**100%**

Source: own processing

The analyzed posts show that emojis were used to express emotion when placed after short phrases. The smiley emoji, which was the most pervasive one in the analyzed threads (Occurrences = 93, Percentage 43%) was often used to convey positive feelings, happiness or joy. Examples of the smiley's use in combination with short sayings include: "Just keep at it 🙂," "keeping this in mind 🙂," and "Keep on rocking you too! 🙂 ." The meaning of the smiley emoji carries over into these sayings by visually communicating encouragement, a positive attitude, empathy, and support. Similar to the smiley, the grinning face emoji (Occurrences = 62, Percentage 29%) was used to convey good cheer, general pleasure, or humour. Examples from the analyzed posts include short sayings with no more than a few words followed by this emoji, such as "There ya go, then. 😀 ," "Ahhh okay. 😀," and "That's me! 😀," which conveyed a friendly atmosphere of reciprocity, trust, and playfulness. Other short sayings like ""NO STAIRWAY" 😀", and " 😀 LOL 😀" communicate outright hilarious interaction. The grinning face emoji here further emphasizes the playfully exclamatory tone conveyed by the capitalized letters, with the second example featuring two occurrences of the emoji combined with the acronym LOL ("laughing out loud").

The winking grinning face emoji (Occurrences = 20, Percentage 9%) that supported communication through playful, suggestive, or ironic tones had a similar function to the grinning face emoji. For example, participants put it at the end of statements like "When I can do it, you can do it as well 😉," functioning here as a self-deprecating encouragement. The face savouring food emoji (Occurrences = 12, Percentage 6%), which would commonly be used to express that food is delicious or that a person is attractive, took on another meaning within the analyzed posts. Examples of its use include longer sayings such as "Sounds like you got the most out of Rocksmith 😋" conveying humour and virtually saying "you ate the entire cake" (i.e., you got the most out of the game). However, in another context, for example in a sentence like ""Needs some work." 😋," this emoji visually signifies effort and commitment.

The frowning face emoji (Occurrences = 11, Percentage 5%) did convey feelings of disappointment, affectionate sadness, and moderate concern. Used at the end of short sentences this emoji took on the meaning that was most appropriate for the context. The first example ("Good that you pointed it out. 🙁") employs the frowning face as a visualization of direct disappointment. The second example ("Doesn't improve things at all. 🙁") expresses feelings of affectionate sadness. In contrast, the grinning face with sunglasses emoji (Occurrences = 4, Percentage 2%) functioned as an indicator of "coolness," as shown at the end of the sentence "Logged in to give your post a thumbs up! 😎." On a more adverse note, the pouting face emoji (Occurrences = 4, Percentage 2%) was used at the end of shorter and more direct statements like "Anything with arpeggios! 😡." This emoji (applied in this manner) conveyed the user's frustration or anger, with the colour red bearing the strength of the intensity of the emotion. The question face emoji (Occurrences = 4, Percentage 2%), often used to convey a question or confusion, reflected this function within the analyzed posts. The first example of its application ("What should i do. 🤔") means that the user is confused as to what should be done. The second example ("I'm faking it.... 🤔") indicates that the user is questioning his or her own actions in regard to the situation. The neutral face emoji (Occurrences = 2, Percentage 1%) was used at the end of short statements like "it's worse 😐," functioning as mild irritation or concern. Another less commonly used emoji found in the analyzed posts was the rolling eyes smiley (Occurrences = 2, Percentage 1%). This emoji was applied at the end of the statement "And who knew that musicians weren't perfect! 🙄," which conveys a mildly sarcastic commentary about the validity of this statement made by the user.

Audiovisual Resources: Pictures, Graphics, and Videos

The use of various pictures and graphics posted by users shows how different modes can support guitar learning in different ways, with different functions, such as: (1) pictures of and from the Rocksmith game; (2) pictures and graphics related to a guitar skill or technique; (3) pictures related to guitar playing styles; (4) pictures of guitar products; and (5) pictures conveying humour (see Table 4).

Pictures and Graphics	Occurrences	Percentage
Pictures of and from the Rocksmith game	19	58%
Pictures and graphics related to a guitar skill or technique	7	21%
Pictures related to guitar playing styles	4	12%
Pictures of guitar products	2	6%
Pictures conveying humour	1	3%
Total	**33**	**100%**

Source: own processing

Pictures and Graphics Related to Developing New Guitar Skills

The analyzed posts showed users embedding pictures and graphics to explain certain guitar concepts or skills to other users (Occurrences 7, Percentage 21%). The following example from the analyzed posts demonstrates user PowerMoon5000's use of graphics in a discussion regarding how to properly setup guitar intonation. In this example, user PowerMoon5000 uses a graphic that visually demonstrates the 'intonation rule'. This was done by posting a simple black and white graphic that shows the pitch effect of strings when adjusting the guitar bridge saddle. In the post, the user offers this visual representation of the intonation rule that supports the text posted to users who are having trouble keeping their guitar in tune. In posts that preceded the one containing this image, the conversation focused on this rule and how much it would cost to have this setup done by a professional.

In another entry, user MynOr333 posted a picture of a guitar tablature in a conversation focused on how to properly finger chords and arpeggios. The function of this picture (guitar tablature score of Dionisio Aguado's "Study 2") was to present an example of what an arpeggio study looks like in tablature form. It also serves as an option for users to refer to and get familiar with, should they decide to learn how to play an arpeggio study (short exercise intended to improve guitar technique). Even though this example may be intimidating to users who don't know how to read guitar tabs, it exposes them to it within the context of an informal discussion. In this example, user MynOr333 posted this picture to show other users the difference in how guitar arpeggios look like on the guitar tab as opposed to how they are visually displayed in Rocksmith. MynOr333 posted this picture in conjunction with the short phrase "Somebody said arpeggios?? Here you go >> (This music is free of rights)" indicating that this is an example that they could freely download and use. However, the use of this picture did not have a visible impact on the rest of the conversation that followed in the thread. Users proceeded with the discourse as if this was a one-off example and did not discuss it or talk about it in the remaining posts of the thread. Graphics and pictures as used in these first two examples within the analyzed posts mainly served an overall function of supporting the posted text by visually representing the specific concept or guitar technique being discussed.

Moreover, there was also evidence of some users embedding pictures to verify and support their statements. The pictures used in these posts were employed for different purposes: (1) to provide users a visual of how the guitar can be modified to support a unique playing style (occurrences: 4; percentage: 12%); and (2) to clear up any confusion by showing users a particular guitar product (occurrences: 2; percentage: 6%). The first example is a picture used as visual evidence of how the guitar can be modified to accommodate a unique guitar playing style. In a discussion regarding players that play their guitars in ways that are considered as untraditional or unorthodox, user RamJam1 embeds a picture of surf rock guitarist Dick Dale. Other users in the forum referred to players such as Jimi Hendrix, who was also a left-handed player and flipped a right handed Fender Stratocaster upside down with the strings in proper order (6th low E, 5th A, 4th D, 3rd G, 2nd B, 1st high E) for left handed playing. However, in RamJam1's response to these users, it is explained how Dale, who is shown using a left handed Fender Stratocaster, would string his guitar in reverse order starting with the low E string at the bottom (6th high E, 5th B, 4th G, 3rd D, 2nd A, 1st low E). Without a supporting picture such as that of Dale it might have been more difficult to understand this concept. Not only did this picture of Dale function as evidence of his unique playing style to users of the discussion thread, it also assisted in introducing another unique playing possibility, besides what Jimi Hendrix did, to novice players or those not familiar with Dale's technique and style.

The following example from a different discussion thread visually contributes to the discussion by showing the package of a specific product. In a discussion thread regarding different solutions for best achieving low tuning on the guitar, user PowerMoon5000 included a picture of a particular guitar string set to best achieve this. Users participating in the thread posted different methods to drop tune the guitar, such as tuning down a half step (E*b*), a whole step (D), or using a seven string electric guitar. User PowerMoon5000 suggested stringing the guitar with a heavier gauge string set made by Ernie Ball to ensure stability when down tuning. By posting the image of the actual string set packaging, the user conveyed in just one picture what might take several lines of text to describe. This image also serves as a convenient visual reference for users who might want to purchase this particular set of guitar strings. By referencing this picture, they would have confidence that they are purchasing the correct string set. As shown in these examples, using embedded pictures facilitates communication and lessens the potential for misinterpretation or confusion.

Besides short sentences, emoticons, and emojis (as discussed in a previous section), a user (occurrences: 1; percentage: 3%) expressed humour by posting a humourous image in response to another user's post regarding spending an average of 1,000 hours learning to play guitar through Rocksmith. This humourous photomontage (that could have been found on the Internet or modified by someone else) functions not only as a representation of a furry cute cat playing the guitar, much in the way that a human guitar player would, but also as a playful mockery towards the user who spent nearly a 1,000 hours learning guitar through Rocksmith. Humourous pictures such as these convey creativity and also function as playful encouragement to users who might have spent several hours learning guitar through Rocksmith. User SuperFlyV also conveys humour through text and emojis by saying "Having fun is the important part! 😄" and "What do you feel is holding you back now?". The use of the exclamation mark and the winking grinning emoji emphasize the importance of having fun when playing and learning to play the guitar, which promotes a positive atmosphere and encourages users that spend hours upon hours learning to play the guitar with Rocksmith.

Videos

The analysis revealed the use of videos in users' posts, both as videos found on *YouTube* (users embedding or including hyperlinks to non-user created videos) and user-generated content (users creating the videos), as illustrated in Table 5.

Table 5: Videos Found in the Analyzed Data

Videos	Occurrences	Percentage
Embedded *YouTube* videos (not created by users)	19	66%
Links to *YouTube* videos (not created by users)	9	31%
Embedded *YouTube* videos (created by users)	1	3%
Total	**29**	**100%**

Source: own processing

The analysis showed that the online video platform of choice for users of the forum was YouTube. YouTube is a free online video hosting site where anyone can create a free account to upload videos and establish his or her own YouTube channel. There was evidence from the analyzed posts that users almost exclusively embedded (occurrences: 20; percentage: 69%) or posted hyperlinks (occurrences: 9; percentage: 31%) to YouTube videos within their posts. However, not all posts that were analyzed embedded videos or posted hyperlinks, but the ones that did were about existing videos (occurrences: 19; percentage: 66%) from various celebrities and/or teachers taken from YouTube. The choices of YouTube videos used by the participants of the forum ranged from formal to informal guitar lessons with different approaches and techniques, at times presented through humour. The first example is a video that user King_MassAxe selected for an answer to another user in a discussion thread that focused on how to properly apply the sweep picking guitar technique. This video was initially created and posted to YouTube by Rob Chapman, who is considered a YouTube celebrity and currently has approx. 750,000 subscribers to his YouTube channel. In the video, which is approximately twenty-three minutes in length, Chapman is dressed up in a dragon costume, which humourously exceeds the expectations set in the title of his lesson "Enter The Diatonic Sweeping Dragon – Modal Sweeping Guitar Lesson" (Picture 1). This signals to viewers a playful and humourous side to his character, while he still covers the content like a teacher. This video employs humour by introducing viewers to a complicated guitar technique in a playful, yet informative way. Guitar videos like Chapman's have the potential to inspire creativity and critical thinking in guitar performance, composition, and music education.

The following example is a video that user VladSabbod8 embedded in a post in response to other users in a thread regarding the proper way to avoid problems with playing upstrokes on the guitar. This video was originally created and posted on YouTube by Ben Eller, who is a YouTube guitar teacher with currently more than 350,000 subscribers to his YouTube channel. The video is entitled *This is Why You Suck at Guitar, lesson 1: Your picking sucks* and is approximately eight minutes in length (Picture 2). This video was published on YouTube by Eller on November 26, 2013 and has so far drawn more than half a million views.

Picture 1: Rob Chapman dressed as a dragon in the instructional video
Source: author's screenshot; CHAPMAN, R.: *Enter the diatonic sweeping dragon – modal sweeping guitar lesson.* Released on 7th November 2013. [online]. [2020-11-11]. Available at: <https://www.youtube.com/watch?v=7vlyG4An8ec>.

Picture 2: Ben Eller's picking patterns guitar lesson
Source: author's screenshot; ELLER, B.: *This is why you suck at guitar, lesson 1: Your picking sucks.* Released on 26th November 2013. [online]. [2020-11-11]. Available at: <https://www.youtube.com/watch?v=kqwpdddKBpQ>.

In contrast to Chapman's video, Eller does not dress up in a costume. Instead, he presents himself to his audience in casual attire. However, Eller does similarly follow in the same footsteps as Chapman by infusing humour into his guitar lesson on proper guitar strumming. While Chapman employed an 'Englishman' style of humour, Eller uses a comedy-like approach to draw in his viewers. In these examples, both videos offer a humourous presentation of complicated and demanding guitar techniques in a non-intimidating way, as opposed to dry formal lessons often found in formal music education settings.

The use of YouTube videos for technology-mediated learning has become more and more popular due to abundant access made possible by the Internet. Because of this, users have the ability to create and upload their videos on YouTube and instantly share them with the world. One of the participants in the discussion forum, MynOr33, created and shared a YouTube video (occurrences 1; percentage: 3%) to demonstrate the raking technique to his fellow users. This video was directly embedded into a post in a discussion forum thread. In contrast to the previously reported YouTube videos posted by other users (video lessons taken from YouTube and made by people who were not users of the forum), this brief video is straightforward, with very little dialogue other than short instructions and brief explanations of the technique. It does not contain any technical elements or editing as found in Chapman's or Eller's video lessons discussed above. The video itself is produced and shot possibly with a lower-end consumer camcorder or with a smartphone. MynOr33 does have other videos that are not posted on the Rocksmith forum and currently has approx. 200 subscribers to his personal YouTube channel. This lesson was published as an unlisted video on YouTube on March 14, 2017 and has since drawn approx. 50 views. The total length of the tutorial is less than 4 minutes, with no edits or cuts. User MynOr33 maintained a low static camera shot angled up, probably by using a small tripod or desk. He did not use any type of zooming in the video. There is no elaborate set or special editing of any kind in this video tutorial. However, this video tutorial allows users to have a clear view of the player's right-hand movements and left-hand fingering on the fretboard.

Discussion

The multimodal analysis revealed a substantial use of multimodal communication within user discussions, which included the use of emoticons and emojis as a way of communication and expression, embedding pictures, charts, and graphics for the purpose of displaying concepts related to learning the guitar, or for humourous encouragement, as well as videos posted on YouTube. These multimodal elements found within the data were used as semiotic resources within posts to connect meanings directly to multiple guitar techniques, various playing styles, guitar examples, and humour. These multimodal elements were in several instances combined to communicate effectively, clarify concepts, and convey meaning. For example, emoticons and emojis were used to communicate playfulness and encouragements to persistence. Overall, this contributed to creating a safe learning environment and fostered genuine collaboration opportunities among users. The findings related to the use of multimodality within the analyzed discussion forum also reflect the multimodal interactions enabled by Rocksmith and other contemporary technologies used for music learning, such as digital games, software, apps, augmented reality, virtual worlds, subscription-based services, and other online communities like Ultimate-Guitar.com, Harmony Central, Second Life, The Fretlight Guitar System, Yousician, Fender Play, MasterClass, Guitar Hero, and Rockband.

The findings also echo those of the M. Salavuo's study, which examined member participation in an online music community. Specifically, in the analyzed posts multimodality can be seen through the use of emoticons, emojis, embedded images, visual guitar resources (e.g., guitar tablatures, sheet music, hyperlinks to other websites), and YouTube videos. In this context, YouTube appeared to be the platform of choice among users of the forum for instructional content that they included in their posts. The majority of these videos were embedded in users' posts (69%), while the rest of the videos (31%) were presented through hyperlinks. There was also substantial evidence of forum users posting YouTube videos created by teachers-celebrities on a variety of guitar techniques, skills, and topics.

The YouTube videos embedded within the analyzed posts employed various modes (e.g., video, audio, symbols, emojis, gesture) and humour (e.g., the videos by Rob Chapman and Ben Eller). In contrast to the videos of YouTube 'celebrities' like Chapman and Eller, who have hundreds of thousands of subscribers to their channels, the one created by the discussion forum user was straightforward and with no elaborate production, editing, or humour. This video shows the commitment and dedication of users to provide valuable feedback in the discussion forum, since recording a video is more complicated and time-consuming, and it requires more organization than just posting a simple link.

The use of YouTube videos on the official forum dedicated to Rocksmith aligned to other studies found in the literature. YouTube videos provide users features that can facilitate learning, including the ability to pause, stop, rewind, fast-forward and re-watch the video as many times as they need in order to fully grasp the concept or technique being taught. This informal learning tool provides guitar players with different levels of skills an outlet to learn at their own pace without the types of restrictions that are often associated with traditional face-to-face guitar lessons, which is also facilitated by the game itself (Rocksmith). YouTube also promotes a participatory culture in which all players, regardless of experience or ability, can learn from one another. Because YouTube videos can be viewed virtually anywhere anytime, users of the forum can learn according to their own personal needs. The inclusion of multimodal elements, such as those found in this study, is part of what keeps learners interested and engaged in the learning process. This reflects J. P. Gee's notion that, for learning to be meaningful and effective, learners need to be engaged within social and cultural practices they value.

Conclusion

Findings show that users of the Rocksmith community informally employed multimodal communication as a way to help users develop their own understandings of the guitar itself, guitar techniques and skills, and several aspects of the game. These findings are valuable to instructional designers who want to integrate multimodal communication through social media like YouTube, including videos, pictures, and graphics within online music courses that can engage formal, informal, and non-formal music learners. The findings offer insight into how learners engage with one another within an online affinity space. Gee's concept of 'affinity space' builds upon J. Lave and E. Wenger's construct of *Community of Practice* (1991). Learning in a community of practice develops through the "relations between persons, activity, and the world" as members negotiate meanings and share knowledge. From this perspective, the connection of the social environment with authentic real world activities, much like in an apprenticeship, encourages learning through individual informal processes of finding, sharing and transferring knowledge. The analyzed discussion forum showed several instances of "authentic real world activities," as expressed in user's accounts of personal experiences and the multimodal resources they shared with the community. This is significant because often users employed multimodal resources to build trust within the discussion threads, which facilitated a safe space for them to collaborate and learn from one another. Moreover, the findings of this study can assist all mentioned stakeholders in recognizing the significance of online communities as a viable platform to support and extend the educational value of games in a social and collaborative dimension. Findings also show that the users of the analyzed discussion forum interacted informally through humourous multimodal communication (e.g., by using emoticons, emojis, pictures, graphics, and videos), which fostered an engaging, friendly, and inclusive learning environment that resonates with the playful nature of the game.

Future research, and future iterations of similar games, may address how the multimodal elements found on the discussion forum may be integrated within the games, as opposed to separate online outlets. The analysis of discussion forum threads, and their multimodal features, may also help game designers improve their creations in response to users' needs, as expressed through their online interactions. In addition, future research may also examine how the use of humourous multimodal communication can encourage informal game-inspired learning, within the game and through online communities. Overall, this study shows that the multimodal interaction featured in a game can continue, through other modes and collaboration, on other platforms, like discussion forums. An integration of these platforms may foster the development of innovative learning environment that expand the playful and educational value of digital games beyond their current boundaries.

BIBLIOGRAPHY

ALSHENQEETI, H.: Are emojis creating a new or old visual language for new generations? A socio-semiotic study. In *Advances in Language and Literary Studies*, 2016, Vol. 7, No. 6, p. 56-69. ISSN 2203-4714.

ANTONIADOU, V.: Collecting, organizing and analyzing multimodal data sets: The contributions of CAQDAS. In MOORE, E., DOOLY, M. (eds.): *Qualitative approaches to research on plurilingual education.* Dublin, Voillans : Research-publishing.net, 2017, p. 435-450.

APPLEGATE, M. C.: Redesigning the familiar: How effective are directional control pads in developing musicianship in 8- to 12-year-old children?. In KING, A., HIMONIDES, E. (eds.): *Music, technology, and education: Critical perspectives*. London : Routledge, 2016, p. 108-109.

ARNSETH, H. C.: Learning to play or playing to learn: A critical account of the models of communication informing educational research on computer gameplay. In *Game Studies*, 2006, Vol. 6, No. 1. ISSN 1604-7982. [online]. [2020-11-09]. Available at: <http://gamestudies.org/06010601/articles/arnseth>.

ARSENAULT, D.: Guitar Hero: Not like playing guitar at all?. In *Loading...*, 2008, Vol. 2, No. 2, p. 1-7. ISSN 1923-2691.

BARDEN, O.: Winking at Facebook: Capturing digitally mediated classroom learning. In *E-Learning and Digital Media*, 2014, Vol. 11, No. 6, p. 554-568. ISSN 2042-7530.

BEZEMER, J., MAVERS, D.: Multimodal transcription as academic practice: A social semiotic perspective. In *International Journal of Social Research Methodology*, 2011, Vol. 14, No. 3, p. 191-206. ISSN 1364-5579.

BROWN, J. S., COLLINS, A., DUGUID, P.: Situated cognition and the culture of learning. In *Educational Researcher*, 1989, Vol. 18, No. 1, p. 32-42. ISSN 1935-102X. [online]. [2020-11-11]. Available at: <https://doi.org/10.3102/0013189X018001032>.

DAMMERS, R. J.: Utilizing Internet-based videoconferencing for instrumental music lessons. In *Update: Applications of Research in Music Education*, 2009, Vol. 28, No. 1, p. 17-24. ISSN 8755-1233.

DANESI, M.: *The semiotics of emoji: The rise of visual language in the age of the Internet*. London : Bloomsbury Publishing, 2016.

DERBOVEN, J. et al.: Playing educational math games at home: The Monkey Tales case. In *Entertainment Computing*, 2016, Vol. 16, No. 1, p. 1-14. ISSN 1875-9521.

ELLER, B.: *This is why you suck at guitar, lesson 1: Your picking sucks.* Released on 26th November 2013. [online]. [2020-11-11]. Available at: <https://www.youtube.com/watch?v=kqwpdddKBpQ>.

GEE, J. P.: *Situated language and learning: A critique of traditional schooling*. New York : Routledge, 2004.

GEE, J. P.: Semiotic social spaces and affinity spaces: From the age of mythology to today's schools. In BARTON, D., TUSTING, K. (eds.): *Beyond communities of practice: Language, power and social context.* Cambridge : Cambridge University Press, 2005, p. 214-232.

GRAHAM, K., SCHOFIELD, D.: Rock god or game guru: Using Rocksmith to learn to play a guitar. In *Journal of Music, Technology & Education*, 2018, Vol. 11, No. 1, p. 65-82. ISSN 1752-7066.

HANSFORD, D., ADLINGTON, R.: Digital spaces and young people's online authoring: challenges for teachers. In *Australian Journal of Language and Literacy*, 2009, Vol. 32, No. 1, p. 55-68. ISSN 1038-1562.

HARMONIX: *Rock Band (series)*. [digital game]. New York : MTV Games et al., 2007-2017.

HARMONIX et al.: *Guitar Hero (series)*. [digital game]. Mountain View : RedOctane et al., 2005-2015.

HONG, J. C. et al.: Internet cognitive failure relevant to self-efficacy, learning interest, and satisfaction with social media learning. In *Computers in Human Behavior*, 2016, Vol. 55, No. 2, p. 214-222. ISSN 0747-5632.

CHAPMAN, R.: *Enter the diatonic sweeping dragon – modal sweeping guitar lesson.* Released on 7th November 2013. [online]. [2020-11-11]. Available at: <https://www.youtube.com/watch?v=7vIyG4An8ec>.

JENKINS, P.: Formal and informal music educational practices. In *Philosophy of Music Education Review*, 2011, Vol. 19, No. 2, p. 179-197. ISSN 543-3412.

JENSON, J. et al.: So you think you can play: An exploratory study of music video games. In *Journal of Music, Technology & Education*, 2016, Vol. 9, No. 3, p. 273-288. ISSN 1752-7066.

JEWITT, C.: *The Routledge handbook of multimodal analysis.* London : Routledge, 2014.

JEWITT, C., BEZEMER, J., O'HALLORAN, K.: *Introducing multimodality*. New York : Routledge, 2016.

JEWITT, C., PRICE, S.: Multimodal approaches to video analysis of digital learning environments. In *Proceedings of BCS HCI 2012 Workshops*: *Video Analysis Techniques for Human-Computer Interaction.* Birmingham : BISL, 2012, p. 1-4. [online]. [2020-11-11]. Available at: <https://www.scienceopen.com/document_file/e4453aee-043d-413f-843c-eb9b7ee14798/ScienceOpen/001_Jewitt.pdf>.

KRESS, G.: *Literacy in the new media age*. New York : Routledge, 2003.

KRESS, G.: *Multimodality: A social semiotic approach to contemporary communication.* London : Routledge, 2010.

KRUSE, N. B., VEBLEN, K. K.: Music teaching and learning online: Considering YouTube instructional videos. In *Journal of Music, Technology & Education*, 2012, Vol. 5, No. 1, p. 77-87. ISSN 1752-7066.

LAVE, J., WENGER, E.: *Situated learning: Legitimate peripheral participation*. New York : Cambridge University Press, 1991.

MARONE, V.: Online humour as a community-building cushioning glue. In *The European Journal of Humour Research*, 2015, Vol. 3, No. 1, p. 61-83. ISSN 2307-700X.

SALAVUO, M.: Social media as an opportunity for pedagogical change in music education. In *Journal of Music, Technology & Education*, 2008, Vol. 1, No. 1, p. 121-136. ISSN 1752-7066.

SONG, K. et al.: Students as pinners: A multimodal analysis of a course activity involving curation on a social networking site. In *The Internet and Higher Education*, 2017, Vol. 33, No. 2, p. 33-40. ISSN 1096-7516. [online]. Available at: <https://doi.org/10.1016/j.iheduc.2017.01.002>.

STONE, B. G., MILLS, K. A., SAGGERS, B.: Online multiplayer games for the social interactions of children with autism spectrum disorder: A resource for inclusive education. In *International Journal of Inclusive Education*, 2019, Vol. 23, No. 2, p. 209-228. ISSN 1360-3116.

UBISOFT SAN FRANCISCO: *Rocksmith*. [digital game]. Montreuil : Ubisoft, 2011.

WALDRON, J.: YouTube, fanvids, forums, vlogs and blogs: Informal music learning in a convergent on-and offline music community. In *International Journal of Music Education*, 2012, Vol. 31, No. 1, p. 1-16. ISSN 0255-7614.