

WHOLODANCE

Whole-Body Interaction Learning for Dance Education

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Overview of the project

WhoLoDancE is a three-year project (January 2016 - December 2018) Research and Innovation Action, under the framework of ICT2015 of H2020 aiming at designing and developing whole body interaction tools to support dance learning. The consortium of WhoLoDancE consists of a) Technical Partners, b) Four Dance Expert partners from different countries (UK, Spain, France and Greece) with a mixed profile of Dance Education institutions and choreographing companies, covering four different dance genres (ballet, contemporary, flamenco, and Greek folk). The aim of the project is to create new technologies for capturing and analysing dance movement to facilitate whole-body interaction learning experiences for a variety of dance genres. Working together we will develop a protocol for the creation and/or selection of dance sequences drawn from different dance genres for different teaching and learning modalities.

Executive summary

For this part of the WhoLoDancE project, COVUNI and ATHENA are leading the evaluative work on the various tools that are being built. While many of the tools are in Alpha form, the consortium has agreed that carrying out a number of smaller evaluative sessions early on with key stakeholders is important to get the necessary feedback. The Centre for Dance Research (C-DaRE) at Coventry University, UK, is one of Europe's leading Research Centres for dance. Our research is rooted in the creation, analysis and publication of diverse dance practices, in analogue and digital form. Our researchers collaborate on an international basis with artists and research organisations, and our research is funded by national and international research councils, trusts and the European Union. Athena Research and Innovation Center is located in Athens, Greece. The mission of Athena RC is to conduct outstanding research in Informatics and Computational Sciences and to ensure this research has an impact on society, especially regarding local needs. The vision of Athena RC is to serve the full spectrum of the research lifecycle, starting from basic and applied research, continuing on to system & product building and infrastructure service provision, and ending with technology transfer and entrepreneurship.

For this deliverable COVUNI and ATHENA held a number of interviews, workshops and drop-in sessions with target groups and also hosted events in London and in Athens where artists, practitioners, developers, academics and educators were invited. The results indicate that the WhoLoDancE project is timely, forward-thinking, exciting and innovative and that the niche market is looking forward to the release of the tools when they are readily available.

Table of contents

Overview of the project	4
Executive summary	4
Introduction	7
Background	7
Role of this deliverable in the project	7
Structure of the document	8
Chapter 1 Impact report (COVUNI)	8
Profile of users and experts.....	8
Methodology and approach	8
Outcome from first report- Deliverable 1.2 Interviews report	9
Conclusion of the first interview report	12
Findings from Second interview report.....	12
Language.....	13
Visualisations and avatars within learning context.....	13
Summary of findings from external interviews - avatars	13
Visualisations for creative environments	15
SUMMARY	16
Chapter 2 Evaluation of the Blending Engine	17
Participant profile.....	18
Methodology and approach	18
Outcomes	19
Online questionnaires	20
Google form questionnaire	20
Evaluation results - Attrakdiff online survey	22
Findings and conclusions.....	24
Impact on the project.....	25
Chapter 3 Choreomorphy interaction system	26
Participants profile	26
Evaluation procedure and setting	26
Results of the evaluation	27
Impact on the project.....	29
Chapter 4 WML usability evaluation	30
Description of the tool.....	30
Method	30
Results	32
User experience questionnaire results.....	32
User observation and interviews.....	33
WML evaluation at the Athens Researchers' Night workshop.....	33

Conclusion 35

References 35

APPENDIX 36

WML Usability evaluation – User recommendations..... 44

Introduction

Participative user-based evaluations of the WhoLoDancE prototypes are necessary to identify usability problems. For this deliverable, we discussed the project with key stakeholders in one of two ways: i) either theoretically, asking them about the potential that the project has without actually showing them any tools and/or ii) showing them tools that are in Alpha stage. What was observed was that the key stakeholders, even those that had some reservations about machine learning, felt that the consortium's tools are intuitive and could enhance their practice as dance artists, teachers and learners. Questions around the project's open-access policy tended to permeate conversations; dancers were impressed with the motion capture data. In many of the evaluative sessions, interviews and events, participants were captivated by the visualisations, the repository of motion capture data and the focus and attention WhoLoDancE has on preserving intangible cultural heritage using digital platforms.

Background

This deliverable focuses on the Blending Engine and Choreomorphy interaction system tool. The blending tool is built on the work carried out in WP2 and particularly Motek's work with motion capture and the building of the pipeline. The motion capture work draws on dance material provided by all the dance partners including Stocos (Madrid, Spain), K-Danse company (Toulouse, France) and Lykeion Ton Hellinidon (Athens, Greece). The captured sequences were created based on the different motion principles agreed upon by the dance partners. The naming convention of the dance data includes the motion principle in the filename which was important when transferring all the motion captured FBX files to the Blending Engine tool and its repository. The motion principles were used as "tree names" whereas the sub-motions became sub-directories and sub files.

Deliverable 2.2 fell within WP2 and it entailed the creation of detailed shot lists for motion capture and multimodal capture, the creation of a design document for the syllabus display, blending software and the detailed development of the optimal motion capture pipeline suited for the project. These steps preceded the motion capture work carried out in year 1 of the project. The main process of motion capture was followed by a secondary motion capture and multimodal data capture of key poses and key transitions which allowed Motek to begin development of the Blending Engine. This work with the motion capture sessions directly fed into the building of the Blending Engine, as it holds an exhaustive repository of movement, which the user needs to blend different movement patterns.

The Choreomorphy interaction system allows 3D display of the dancer's movement in real-time, while it provides the option of displaying recorded motion captured sequences. Through an intuitive interface, the user can see the same movement sequence on different avatars, and add special effects such as trails and traces, customizing characteristics like, fade-out duration time, to focus on specific aspects of movement such as shapes in space and trajectories.

It gives the option of choosing and customizing the visualizations of both the dancer's body and movement, facilitating self-reflection and experimentation with different visualizations and avatars. Unlike most available digital dance learning systems, Choreomorphy is not a system which asks from the dancer to imitate specific movements provided by a previous set of predetermined scores or set sequences. It rather aims at providing a variety of choices in visualizing movement based on imagery examples used in dance practice.

Role of this deliverable in the project

The WhoLoDancE project involves the creation of a custom Blending Engine that will relate to the captured FBX data files as a relational database and will enable the blending of any sequence with any other sequence in the database. For this purpose, all motion capture data that was produced during year 1 needed to undergo different processes of synchronization. After that work occurred, Motek started developing the Blending Engine, while other technical partners developed their tools. ATHENA developed the annotation tool and the Choreomorphy interaction system which as noted above, is a novel interactive system addressed to dance practitioners and experts that supports reflective dance improvisation in both an educational and a

choreographic context. The system is in its prototype form and has been tested extensively in the lab with experienced practitioners and also demonstrated and used in events where dancers of different genres and levels of expertise were present.

Structure of the document

This deliverable will discuss which tools were evaluated and the reasoning behind this decision, the methodology, the outcomes and the evaluation of the results. An appendix also contains the Project Information Sheet and consent form that was signed by participants. The document will outline in Chapter 1 the Impact work carried out by COVUNI during M15- M18. Chapter 2 will then describe the Evaluation of the Blending Engine which occurred during M18-20 and Chapter 3 will expand on the Choreomorphy interaction system work developed by ATHENA.

Chapter 1 Impact report (COVUNI)

The Centre for Dance Research (COVUNI) carried out an internal assessment on impact for key projects. WhoLoDancE fell under this remit and this Impact Report evaluation is a combination of two sets of interviews. This builds on a previous report that included findings from an earlier set of interviews. Which were aimed at supporting the technology partners to come up with a design that would be useful to the dance community.

For the Impact Report the COVUNI team decided to design a second set of questions which fed into a series of semi-structured interviews with user testers of the tools to test the WhoLoDancE project's direction and approach since the first set of interviews were conducted. This second iteration of interviews were carried out from early April 2017 until mid-May 2017 and analysis of the data occurred from mid-May 2017 until mid-June 2017. The work questioned the likely impact of the technology developed during the project on dance teaching and dance rehearsal processes and its possible uptake. Interviewees included representatives of leading UK dance companies, teachers in the private and community sector and independent artists. The aim was to identify and interview 10 respondents. The interviews adopted a methodological framework drawing on complexity theory to create a combination of cognitive maps and interview responses through inviting respondents to reflect on their work and experiences, and if and how the tool will change the way they work in the future. In summary, this report clearly identifies how digital technology, 2D and 3D visualisations, holograms and virtual reality are impacting learning and choreographic scenarios.

Profile of users and experts

For both sets of interviews carried out, for the Deliverable 1.2 Interviews Report and this Impact work, the COVUNI team carefully selected its interviewees and chose individuals from various backgrounds, demographics and nationalities. In addition to interviewees based in Europe, interviewees also came from Singapore, Australia, Nigeria and the US. The decision to interview an international pool of experts was made to ensure that we gather a multilingual and international perspective of the language used by dancers, teachers and choreographers from various backgrounds. The COVUNI team approached an equal number of men and women for interviews but were unable to successfully secure an equal gender ratio. Age was also a key component that was considered as we have dancers, choreographers and teachers as young as 22 to 50+ years of age. Some of the dancers, choreographers and teachers have varied practices ranging from African, yoga, to contemporary, ballet, Flamenco and folk dances. A core aim of the interview process was to secure respondents representing a broad range of dance genres.

Methodology and approach

This work lends itself to qualitative and quantitative research methods and for this reason interviews, paper questionnaires and an online survey were used for the deliverable while interviews were solely used for the second set. A range of resources were consulted before carrying out this work and a series of meetings amongst the COVUNI team members and the project partners took place while preparing the various

documents used to carry out the interviews and the writing of this report. We approached each participant with the same pre-determined set of questions (see Appendices). The interviews were audio recorded for analysis purposes. All interviewees were drawn from the project's contacts.

All interviewees received a Participant Information Sheet (see Appendices) and were required to sign an Informed Consent Form (see Appendices) as a mandatory precondition for their involvement in the activity. Coventry University's ethics committee approved these documents before distributing to participants. Gaining ethical approval ensures that the project team is proceeding responsibly with due care for the participants and the storage of data that will be produced as part of the data capture process. Whilst it is not possible to anonymise the audio recordings, these recordings will be made as part of the research process for internal analysis and reference only, to assist in the database creation process and the design of the digital tools so will not enter the public domain without prior permission being specifically sought from the participant. All audio recordings will be retained securely and no personal data of the participants will be stored.

It is the duty of all researchers to ensure that any research activity meets the highest ethical standards. The project team has submitted the documents for ethical review and clearance to Coventry University's research committee in line with its requirement that all subject related research obtain ethical approval before undertaking any research involving human participants (See Appendices). WhoLoDancE falls under Coventry University's requirement that ethical approval is required for any research, design studies, artistic studies, experiments, survey work, questionnaires, interviews, focus groups or case studies.

Outcome from first report- Deliverable 1.2 Interviews report

The work carried out in Deliverable 1.2 explored the relationship between dance and technology and that data underpinned the impact report and the second set of interviews carried out. A primary analysis of the first interviews report was built around the interview template (See Appendices). The project team drew on Laban Movement Analysis terms, which originate from research into human movement, and designed a set of Movement Principles. They were established to encapsulate the essence of movement and were fundamental to the design of the software. The Principles drew on the collective knowledge and experience of the consortium, which includes dance and technology experts. The work for Deliverable1.2 focused on testing out the validity of these Movement Principles and their application by gathering the views of and feedback from the wider dance community and those working in new technologies. These Movement Principles therefore formed the foundation for designing the questionnaire and interview questions for the impact interviews.

In a general sense, the career development characteristics of the interviewees was an eclectic approach to dance training, teaching and performance. Many have studied and practiced a variety of dance styles and genres. Under the movement principles section, imagery was a core part of the dancer's toolbox, for both teaching and performing. The imagery was derived from numerous sources. Some are derived from specific codified practices (e.g. Skinner Release Technique, Body Mind Centering, etc.) whilst others are more poetic and personal, or are rooted in biomechanical or D1.2 – Interviews Report. For the final section when dance and technology was discussed, all interviewees were comfortable with the integration of technology into their work, even if the technology is more basic and easy to access and incorporate. Some indicate a more expert integration of technology and an interest in the potential for more sophisticated technology to enhance their practice. A unique division was found when asked about using technology to develop movement. Some participants are open to technology being directly part of their creative process when it is focused on creating movement phrases whilst others do not see technology having a direct role in body-based movement development.

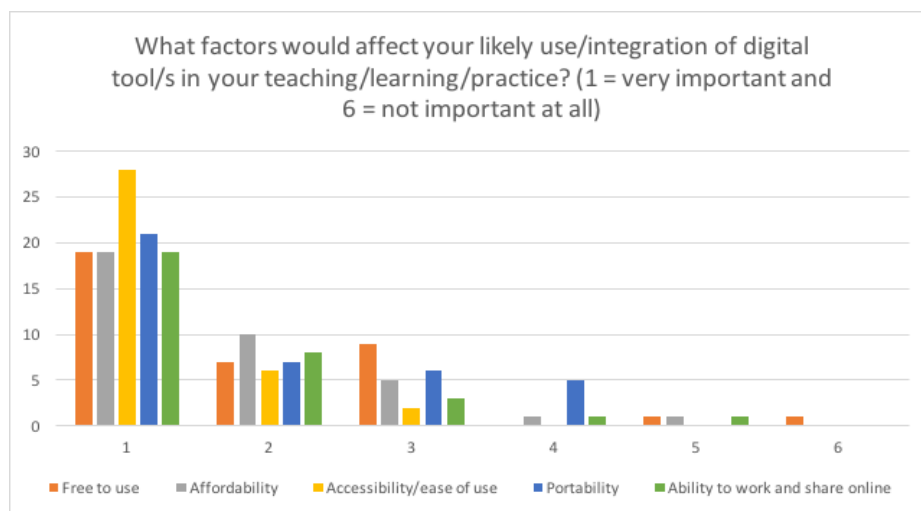
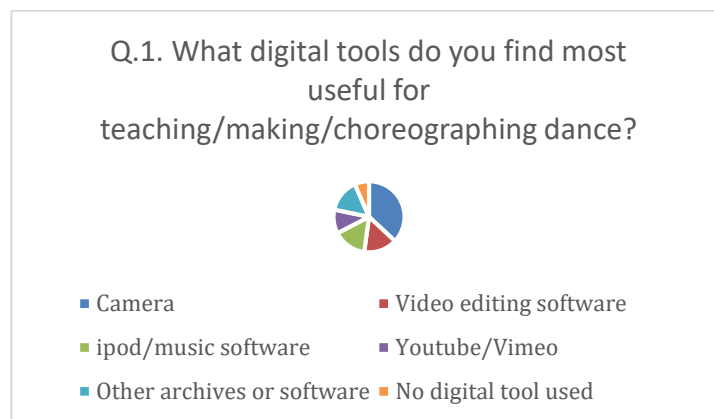
Summary of findings:

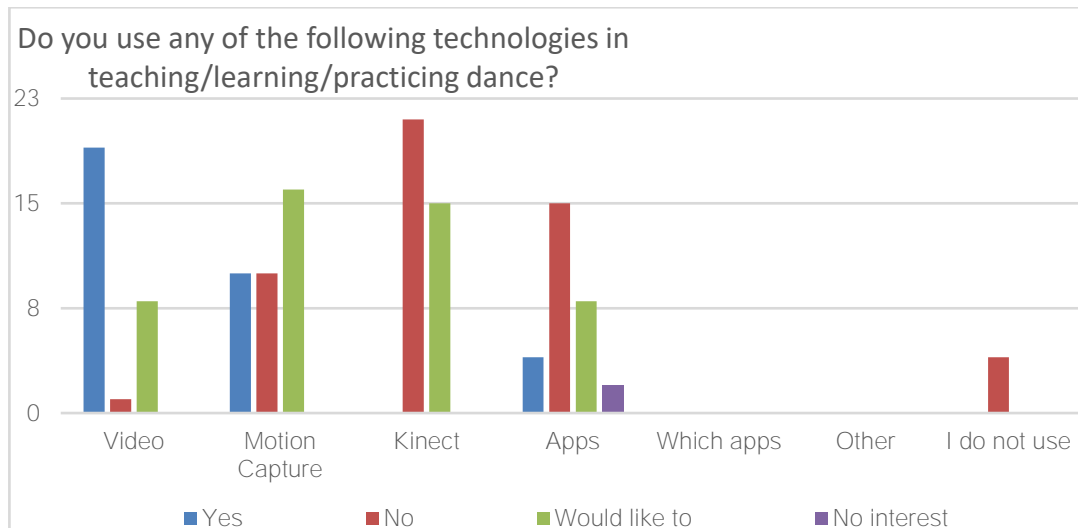
- The Movement principles are widely recognized as a useful foundation to most dance practices.
- Imagery is a valuable tool for learning, teaching and practicing dance.

- Dancers use technology in their practice including some digital technology but most prefer simple to use, accessible, portable and affordable tools.
- There is interest in what an avatar tool can provide for dance learning, teaching and performing but some in the dance community are unsure of how it will benefit their work so will need persuasion.
- An avatar tool that is effective, easy to use and supports the teaching, learning and creative processes of dance will be the most effective.

Below are a set of questions that were asked to the interviewees which illustrate the likelihood of uptake of a digital tool into their practice. The research team asked these 5 questions:

1. What digital tools do you find most useful for teaching/making/choreographing dance?
2. What factors would affect your likely use/integration of digital tools in your teaching/learning/practice?
3. If there was a tool that allowed you to learn dance from a motion capture avatar, would you use it?
4. Would you use it in a learning environment?
5. Do you use any of the following technologies in teaching/learning/practicing dance?





Conclusion of the first interview report

There are themes emerging from the interview material collected that reveal a vast amount of bodily knowledge held by the participants. With various routes into dance training, which includes conventional and non-conventional, a few key people influenced the interviewees during their training experience. This led to developing kinaesthetic and instinctual approaches to teaching and performing movement. Different ways of thinking about the body and the sensual nature of human movement seem to be fundamental to their dance practices. Most of the participants had varying experiences of teaching and revealed that they use imagery; ranging from metaphoric, anatomical to natural and cinematic imagery. Most of the time, a mix of different imagery types was used to explain qualities and dynamics of movement. The imagery that dancers use reflects their training and interests in the creative impulses for their work. There were varying degrees of utilizing technology in teaching and performing. For example, one participant claimed that they did not use technology at all whilst another participant makes work with technology and uses technology in class when teaching – she shared an example where she uses an iPad in class to show the students anatomical images. Some of the participants agreed that they would use technology to help create movement sequences and some said they would not. Those already using technology were keen to see what would be developed with the WhoLoDancE project. The responses therefore indicate a wide range of practices, which is not unexpected. But interviewees are generally open to the possibilities of technology supporting and enhancing their work, recognizing that technology can be a valuable tool in the dance studio and rehearsal environment.

Findings from Second interview report

In the second set of interviews carried out by the COVUNI team which explored the uptake of the tool the WhoLoDancE team is developing, there were three themes that emerged from the set of formal and informal interviews with the experts. A number of dancers, choreographers and teachers from a variety of dance genres were consulted and the question set (See Appendices) covered a number of key themes the WhoLoDancE team are currently exploring. The questions were focused on the blending engine, avatars, uptake of the tool, the use of holographic lens and general uptake of digital technology in a dance practice. Each interviewee was asked to view the July Edit WhoLoDancE film¹.

Three strands that emerged from the data:

1. Language used by the consortium
2. User interfaces and avatars and the types of visualisations used within a dance learning context
3. User interfaces and the types of visualisations within a creative environment context.

¹ <http://www.wholodance.eu/video/>

The rest of this section will look closely into these three strands.

Language

The interviewees were overall excited by the possibility of such a tool and were keen to work with the holographic device and the Blending Engine being developed by the WhoLoDancE consortium. There was a bit of hesitation by the flamenco and the folk dance experts when it came to the language being used by the research team. For example, terms like “blending machine”, “High end” and “Low end” qualities, as well as the type of holograms that were being used were all a bit intimidating. This valuable information at this point in the project allows the COVUNI team to feedback to the WhoLoDancE consortium and reminds us that jargon heavy terms can be off putting to some genres.

In a general sense, all of the participants wanted further clarification as to what holograms meant to the consortium and were concerned that terms can have different meanings depending on the user. This is an important point to highlight to the technology partners and perhaps a glossary of terms with images could be developed to help the users understand the context of the language being used by the consortium. There was also concern around the technologists not understanding the dance world and the nuances of the various dance genres. However, each interviewee was asked to view the July Edit WhoLoDancE Film2 and after viewing the film there was a shift in the interviewees thinking. Participants felt that indeed the nuances were being captured by the motion capture sessions and that the technology experts were attempting to understand the qualities, principles, emotions and mechanics specific to each genre.

Finally, another key finding which emerged was the use of the term “play” and how this word somehow gives the user permission to be “more creative”. The interviewees were excited by the visualisations and felt that a “play button” or “space to play” should be included in the project’s tool. A more detailed analysis of the visualisations will follow.

Visualisations and avatars within learning context

Avatars and visualisations are fundamental to the project and are integral in supporting the learning, teaching and creative environments that WhoLoDancE is aiming to enhance. For this reason, there were questions included in the question set for the impact report, even though the project consortium had already carried out exhaustive research on the topic. For Deliverable 2.5 3D Avatar Scenes, whose author was project partner MOTEK, the authors describe a detailed account of the several guidelines that were determined in the creation of the avatars used within the project’s tool. The creation, development and optimization of the 3D avatars was dependent on the various discussions and the dance partner’s feedback.

Summary of findings from external interviews - avatars

Avatars was a term that was discussed extensively in the various interviews. Many interviewees were keen to learn more and explore the various types of avatars that the project is designing. It was agreed by most interviewees that having a choice and being able to choose which avatar you use and having a variety of avatars is needed for learning, teaching and creative environments. One participant said “Different types of avatars are useful and necessary.” Other participants said that it would be great to have the option to personalise and see “a bit of themselves” in the avatar. Others enjoyed the fact that the avatars were just “bodies in a space that are not looking exactly like me”. There is a general consensus that having control over the type of avatar one can choose, is important. Levels of control are vital to making sure that the user has a personal experience.

All of the interviewees were asked to view the July Edit WhoLoDancE Film3. The interviewees were excited by the short film which included the various dance genres. For the Flamenco and the Folk dance community, the marriage of digital technology, holograms and their respective art form, at first, felt a bit of a strange

² <https://www.youtube.com/watch?v=j3sX64nILEI>

³ <https://www.youtube.com/watch?v=j3sX64nILEI>

combination that didn't quite work well. After discussing the nuances of the project, the interviewees were more convinced that indeed there was potential which could be explored and that indeed digital technologies could compliment these dance styles. The visualisations from the film supported this shift.

Another important finding was that many participants felt that the use of holograms and avatars was linked to being "innovative", "hip" or "cool". One respondent said that depending on the avatar, although it could start off as a "superficial experience, the avatar can prompt you to go deeper. The coolness of the avatar can excite and then lead you to a deeper place". Another individual said that "you want the avatar to be cooler than you". The majority of participants agreed that the use of hologram technology within a studio context felt like an innovative way of dance teaching, learning and creating. There were a couple of participants who felt this could be off putting to some "traditionalists" like those in Flamenco and Greek Folk Dance. These individuals agreed that perhaps with a conversation and some convincing they might see the potential and "be open to this approach".

As we see with these findings, the work that was initiated by Motek and the consortium is indeed on track and useful to the dance users and dance learners. Below are a series of stills from the film that each of the interviewees watched. In summary, the avatars the WhoLoDancE team are currently using and integrating into the tool, are useful to the dancer, choreographer and/or learner.

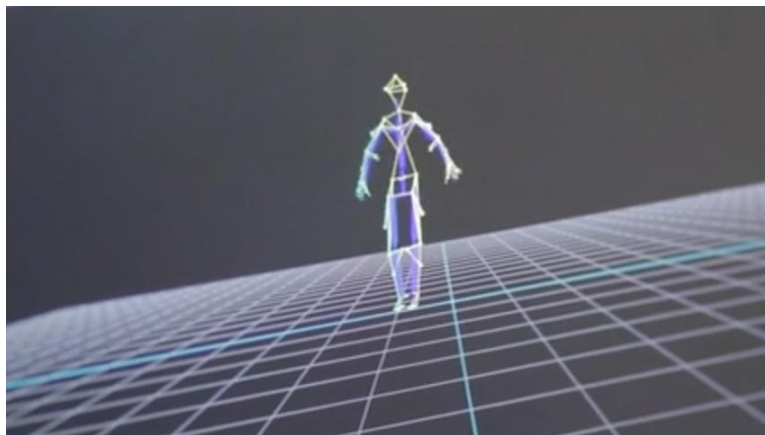


Figure 1. Arrow man from July edit film



Figure 2. Blob avatar from the July edit film

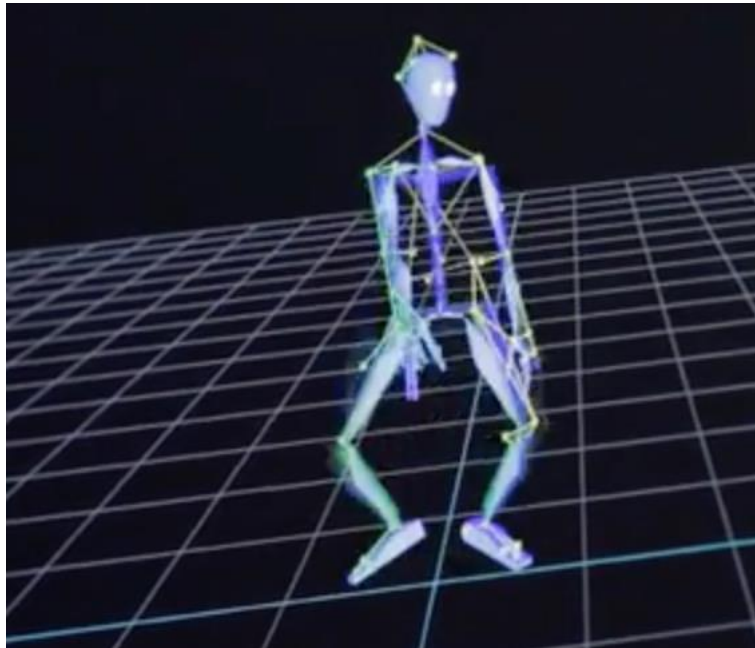


Figure 3: Arrow man from July Edit film

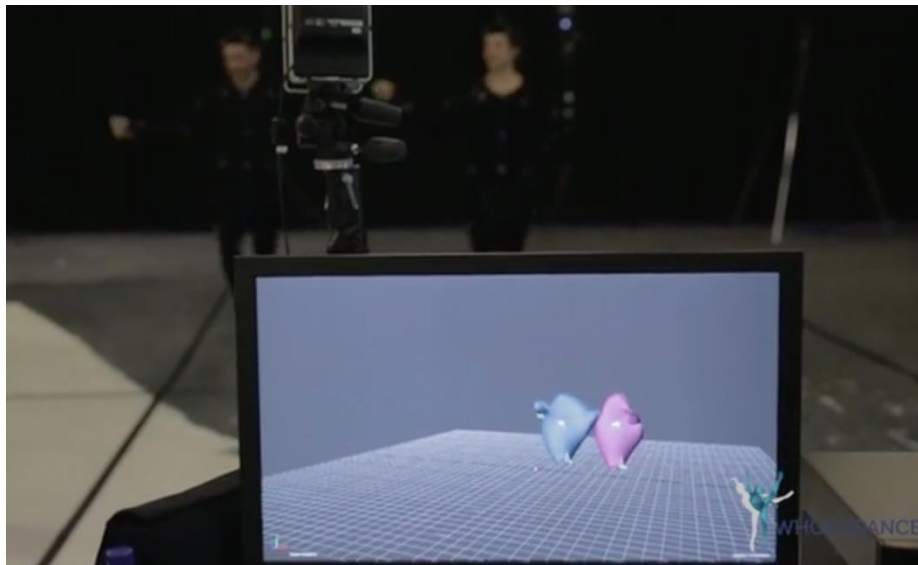


Figure 4: Greek folk dance couple and blob man avatars

Visualisations for creative environments

The ability to control various functionalities of the tool was also seen as important. Two respondents highlighted that a lack of control is discouraging and this idea of “conquering the technology” is not inviting. The technology should challenge but also encourage so that the user can see what is possible. “So, the more control I have, the more I can start to delve into the creative process, that control allows you to make more creative and, perhaps, more specific decisions.” Another participant said “Too much control becomes a potentially confusing thing. I want the apple version of whatever you are doing. I know my limitations!”

In summary, levels of control are enticing and feed into the creative work and encourage what is possible. It has emerged that having varying degrees of control, perhaps a beginner and advanced option for controlling the interfaces is important.

Another significant finding especially for choreographers or users engaging with the tool in a creative capacity, is they want to be able to bring “their studio to the augmented worlds” and somehow see their own environments reflected in the tool or the visualisations. The participants felt it was important to somehow make the familiar creative spaces “available to them in the tool”. One participant said, “it would be great to see my classroom projected in the tool and my dancing avatar, the cooler me, in that space.” And finally, the choreographers felt that it would be incredibly useful to see visualisations of various performance spaces like theatres, arenas or unconventional spaces like galleries, as part of the visualisations options available to them. One interviewee suggested “how wonderful it would be for me to play with all of the avatars and see what they would look like in the theatre where I am preparing my next choreography.” Another participant said that the “visualisations can encourage me to think differently about the space, the bodies in space and my creative practice in that space.” In summary, the general feeling was that the visualisations are an integral part of the creative process.

SUMMARY

In summary, the emergence of virtual reality applications and human-like interfaces has given rise to the necessity of producing realistic models of the human body (Sarris and Strintzis, 2005). The WhoLoDancE project is bringing together a team of expert technologists, developers, researchers, dancers, artists and 2D and 3D model designers to develop a teaching-learning-creative digital tool that can allow the user to employ a variety of state-of-the-art methods to facilitate in the learning and teaching of dance. The dancing human body is at the core of this research project and is allowing programmers to discuss modelling techniques while also pulling in expert teachers, dancers and choreographers.

All of the participants expressed a need to want to keep the “human side” of the teaching, learning and creative process, but felt that such a tool would definitely enhance their own practice of teaching and/or creating. Another important point that was emphasised by all participants was the “attention to detail” and the nuances that every individual body has, and this aspect should not be lost or compromised by the technology. Improving engagement was interesting and important to most of the interviewees and the majority of teachers felt that they wouldn’t want their students or themselves to be “less in touch” or “less engaged” with their bodies or reliant on an external object to “craft, create, or reflect.” The tool was seen as a way to potentially augment their own ability rather than replacing anything they are working/creating/making. As one participant said, they would be happy to support “a magical tool that would not replace but enhance their engagement and enhance the craft”.

In a general sense, the interviewees were quite excited by the work the Consortium is carrying out and see its value not only for the dance and teaching community but also for the wider Arts sector. This impact report highlights that the tool is timely and that there is certainly a market for this work. Although some individuals were at first slightly intimidated by the language and the technical jargon used by the Consortium, there was a general consensus that the field should continue to develop itself and follow technological trends. WhoLoDancE is seen as something special, topical and timely and uptake is heavily reliant on the images, language and manner and how the tool is shared with its key stakeholders.

Chapter 2 Evaluation of the Blending Engine

The evaluation of the Blending Engine developed by Motek was an important part of this deliverable. The Blending Engine has been discussed with key stakeholders in a variety of contexts, as described in Section 1 of this deliverable but placing the tool in the hands of the community had not been done up to this point. For this reason, we organised a drop-in session with key stakeholders in central London, UK in early November 2017. The evaluations considered quantitative and qualitative perspectives as well as commercial potential and a collaborative approach with key stakeholders and other project partners. Fieldwork including informal conversations and prototype development was all considered during the evaluation session of COVUNI's activities. The evaluation session held in London sought to identify pros and cons of the tools and support the consortium's objective to create tools that are market-ready and that fill a void that currently exists in the dance, ICT and Machine Learning field. The usability test and the interviews identified that indeed there is a need for such a tool like the blending engine.

The MOCAP Drop-In Afternoon⁴ for the blending engine was held in central London at a studio with a rich history. A former garment factory, Unit 301 for ten years housed designers, filmmakers, photographers, animators and puppeteers as igloo studios. More recently, it is the London home and studio of artists Gibson/Martelli. The session was held in their London studio which is a meeting place for many artists who work in collaboration with Ruth and Bruno, as Gibson/Martelli. Salons, Hackathons, Film nights all take place in the warehouse space including Palais de Danse, ART//GAME//HACKATHONS and VR FEST. Ruth Gibson, a COVUNI consortium member is also part of the Gibson/Martelli art duo. Ruth Gibson and Bruno Martelli holding the session at the Gibson/Martelli studios was vital to bringing a variety of key people to the evaluative session.



Figure 5. Ruth Gibson presenting the WhoLoDancE Project to participants. (Nov 2017, London, UK) Photo credit: R. Cisneros

⁴ <http://gibsonmartelli.com/mocapdropin/>

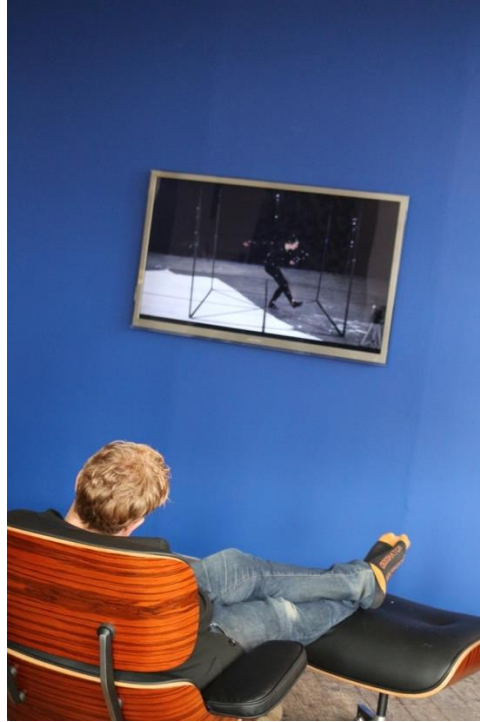


Figure 7. Participant watching the WhoLoDancE film (Nov 2017, London, UK) Photo credit: R. Cisneros

Participant profile

People taking part in the Motion Capture Drop-In Afternoon included a wearables fashion designer, a BAFTA winning animator, a doctor of medical visualisation techniques from Imperial College (UK), a Virtual Reality producer, a curator, head of digital and tech at the V&A museum, social dance enthusiast, a visual artist and a jewellery maker. All the participants have experience of editing software and motion capture, and many of the participants have an interest in dance, movement and/or machine learning.



Figure 8. WhoLoDancE project participants (Nov 2017, London, UK) Photo credit: R. Cisneros

Methodology and approach

As outlined earlier in the deliverable, all participants received a Project Information Sheet and Consent form and signed the forms ahead of the event (see appendices). The participants were also asked to complete a form outlining their experience with motion capture, digital tools, Virtual Reality and their skillset.

This work lends itself to qualitative and quantitative research methods and for this reason interviews, a paper questionnaire and an online survey were used for the deliverable. The testing allowed the developers to gain

insight into what its target audience thinks of the blending engine and we used a “think aloud” method to gain insight into their use and understanding of the tool. In this methodology, users receive minimal input from the organiser of the experiment, and are encouraged to explore the software tool while verbally expressing their thoughts. For an hour of the afternoon session, the designers of the blending engine, Motek, were available via skype to answer any questions and to also engage with the participants. The participants offered direct feedback to Motek.



*Figure 9. Ruth Gibson, Bruno Martelli and Oshri Even-Zohar (on conference call)
(Nov 2017, London, UK) Photo credit: R. Cisneros*

Outcomes

The Mocap Drop-In Afternoon brought up a lot of basic issues and yielded important feedback. The main outcome was that the software is incredibly interesting but is not ready to be launched to the market in its current state. The participants felt that the interface of the tool was intuitive and “familiar” and that the ability to navigate around the tool was user-friendly. There was a list of questions and requests from the participants which were very useful for the consortium, in particular Motek, to hear. Some of those requests and questions are outlined below.

Requests/ Questions:

- Is there a key combo to drag and take into the timeline?
- Is there a method to create a seamless loop?
- Is there a manual available?
- Could the data be edited down a bit more so that the user is seeing the actual dancing rather than the dancers moving into position before starting? Could they start or end without the excess?
- Could there be a ‘sexier’ progress bar?
- Could the slider be colour coded?
- Can it be a Unity ‘plug in’ so most of all it is easy to use. “If not simple to use it won’t be used.”

The consortium is fully aware that the tool is a prototype and the session revealed that these bugs affect the user’s ability to swiftly and efficiently use the tool and blend content. One major problem is the long loading time of the motion capture libraries - this makes it hard to use as it is quite unstable, it crashes especially when you start swapping from developer mode to display mode. There are also a few bugs with the tracks that are displayed when blending the frames.

Informal interviews and conversations were held with participants on their experiences of using virtual reality, motion capture, dance and the intersections between dance and digital technology. Some useful and

valuable feedback was given not only on the avatars but also on the motion capture work and the data itself. Some of the participant's questions are included below.

- How many dance teachers outside the consortium have played with these tools and would use them in their teaching?
- Could the user have the avatar's point of view?
- Could the consortium be thinking of new ways of representing avatar visualisations? The renders are a "little tired".

Later in the document we will go into an analysis of these outcomes. The next section provides an overview of the two online questionnaires that were used by COVUNI. Informal interviews and discussions took place but the team felt it was necessary to allow a form for the participants to anonymously share their feedback and observations.

Online questionnaires

The COVUNI team also used two online questionnaires to help gain insight from the participants. The Google form questionnaire was produced by COVUNI in collaboration with Motek. Another online questionnaire that was completed by the participants was the AttrakDiff survey which allowed us to evaluate the usability and design of the interactive product. These two platforms were used as they were easy to use, familiar to the participants, and allowed to structure them in a way to maximise feedback and gain a thorough analysis of tools.

Google form questionnaire

The google form was only completed by 3 of the participants, although everyone was encouraged to complete the form and was also emailed reminders. Whilst the low number may not be statistically significant, the findings confirmed the discussions and conversations that took place and were very rich in providing more in-depth qualitative feedback – and as evidenced the open comments below.

What is your occupation?

Tech lead, V&A

Retail

Director VR company

How satisfied were you with the tool?

On a scale from 1-5, (1 being low and 5 being high) the participants said:

4

2

3

How relevant and helpful do you think it was for your job or practice?

On a scale from 1-5, (1 being low and 5 being high) the participants said:

4

2

3

How easy is it to use the different dance styles to blend on the timeline?

Not sure I got it to work 100%, but from the demos it looked like you could blend styles easily, even blending different styles and mapping them onto different limbs.

Difficult

bit fiddly but that's understandable as its in alpha

Was the interface user-friendly

On a scale from 1-5, (1 being low and 5 being high) the participants said:

4

2

3

Would you use this tool to create movement? How?

Yes, although I think that would come from a lot of experimentation initially.

Possibly to play around with its capabilities and possibilities. I'd check out the blending capabilities, and if better than other tools, use it for that, if it worked over manually editing the motion in another program

in the same way as iTunes for video - e.g., if there is a quick sequence I want to produce

Which part of the day did you find most relevant?

Probably the videos towards the end of the day - having understood the tool, it was very helpful to see some more applications with the broader understanding of how I could use the tools also.

The introductory presentation including videos

hands on

Any additional comments regarding the sessions or overall agenda?

“The concept of creating a repository of motion captured dancers and dances into a library felt huge. So, it's great to see it can be captured. That data - if able to remix, to view, to create with - is a valuable and rare asset. “

“The tool currently functions more with the user in front of a computer, taking a fair amount of time, which suggests usage in more precise choreography, or even using the tool for creating

animations/visualisations of a created choreography as an end product. Could the tool work with any synced reference video taken by the mocap cameras, or even do some editing with the video, using it as a proxy media for editing the mocap “footage”? (I’m thinking of the UI and editing/video playing of Note tracks iOS/Android app and their private beta of a web version). Another query is if users would use the tool over others for general choreographic use (MotionBuilder etc), or use the tool to utilise the blending engine then export out the blended footage. Could the blending engine capabilities be able to be made into a bolt on to other programs? Realise we were seeing an alpha product. A screen capture video showing a test on how to blend a small demo set of dance data - the process, the end result - would help demonstrate what the blending engine does/will do. It’s probably worth highlighting the features of the blending specifically, to show what it’s doing visually comparing starting material with end product. What are the different blends possible for example, what do they look like. (I went away from the session not knowing this, or having done a successful blend). Could use to help onboard users too, and give some ideas as to how blending could be used.”

Evaluation results - Attrakdiff online survey

All the participants completed the AttrakDiff online survey. The AttrakDiff online questionnaire analysed the information, and the data revealed that the products interface was rated as “rather desired”. This result was achieved comparing the hedonic quality and the pragmatic quality of the product (see Figure 10 and Figure 11). As seen in Figure 10, the word pairs which denotes the user’s affective intensity, reflects that the tool had primarily a positive impression as it scored 0 or higher. For those areas which were smaller than 0, the tool reflected a negative sample. The “pragmatic” result states that “consequently there is room for improvement in terms of usability”. In terms of hedonic quality, the user is stimulated by this product however the value is only average. The “hedonic” result states that there is room for improvement. In addition to the interface being assessed, the attractiveness of the tool was measured. Stimulation and identity of the product was analysed and the identity of the product is desirable but should the consortium wish to bind the user more strongly to the product, it should aim to improve certain sections (see Figure 12). When it comes to the hedonic quality-stimulation, the product is located in the slightly above-average region and meets ordinary standards. The results state that if the consortium wishes to motivate, enthrall and stimulate users even more intensely, it must make some improvements. In summary, the attractiveness value of the tool is located in the above-average region and so the data states that the overall impression of the product is very attractive.

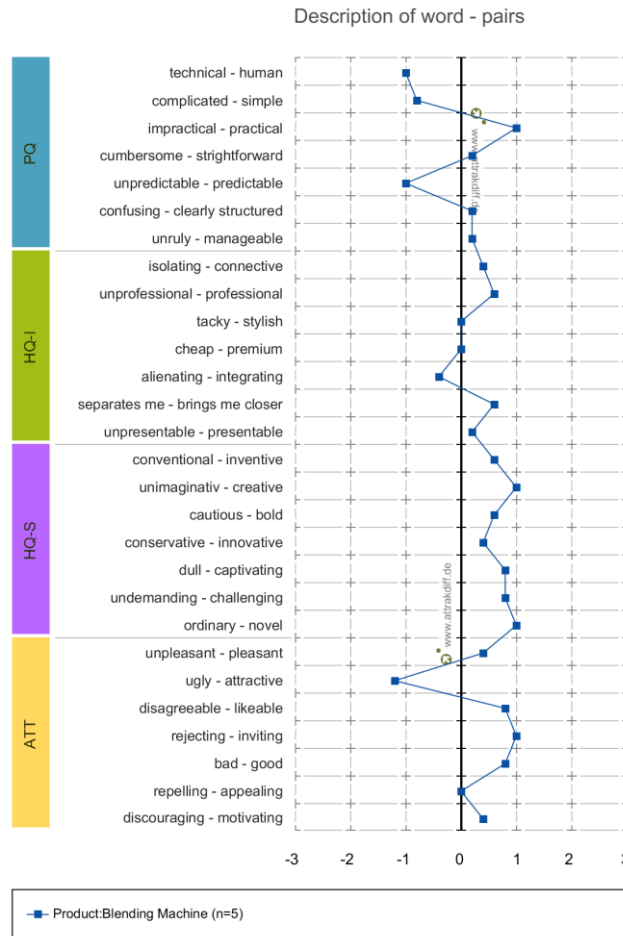


Figure 10. Data from the Attrakdiff survey- word pairs section

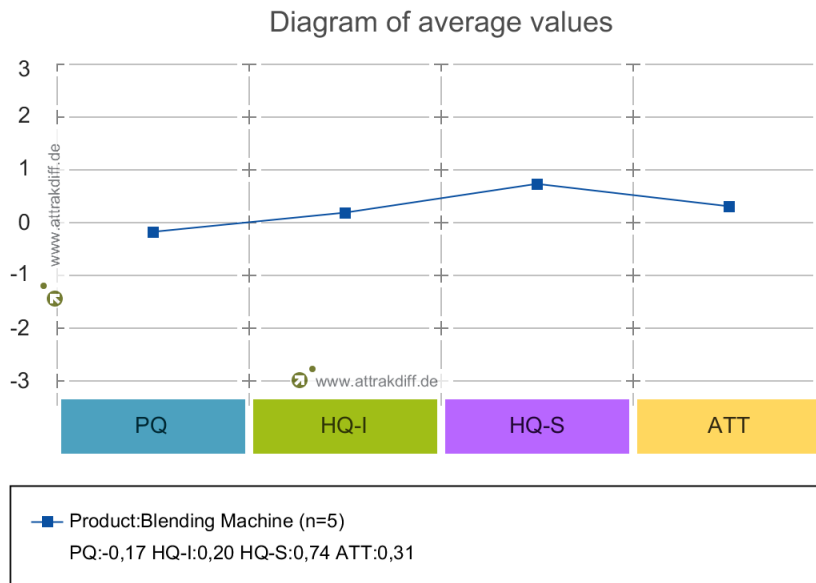


Figure 11. Data from the Attrakdiff survey

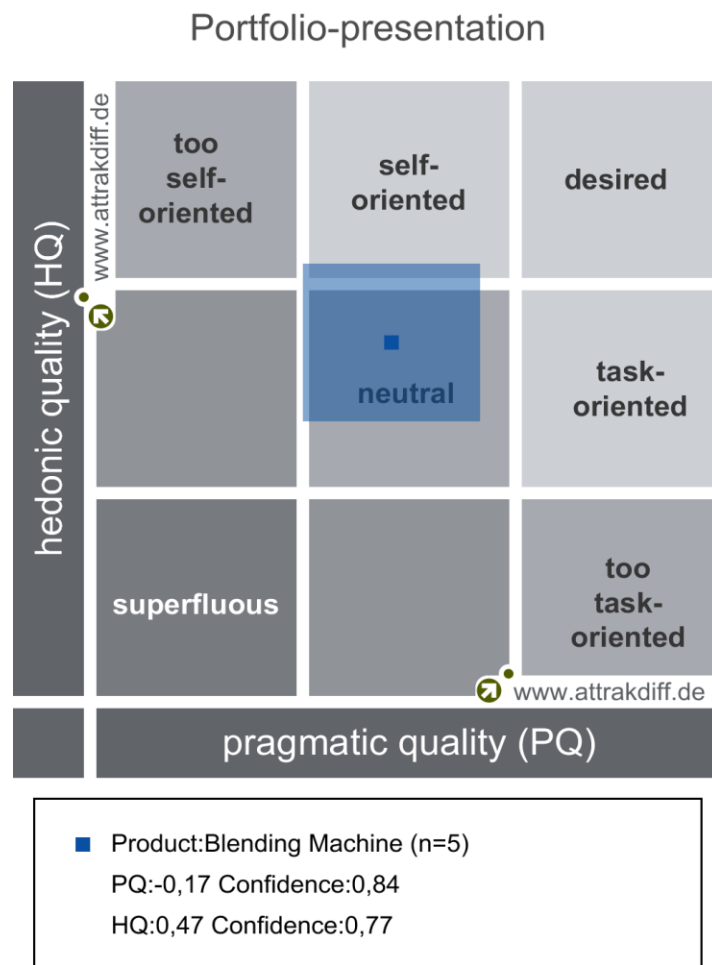


Figure 12. Data from the Attrakdiff survey

Findings and conclusions

The evaluative event was useful as it highlighted four key areas that are beneficial to focus on: i) the visualisations, ii) the interdisciplinary aspect of the tool iii) its use within a choreographic context and iv) data being open-access.

The findings suggest that the robot visualisation was least liked by the participants at the drop-in session but the blue blobby visualisation struck a chord in everyone. Perhaps this avatar suggests and asks the user to think about 'space' in a different way than the familiar ubiquitous trail pathways. The avatar has the potential to prime the user and ask them to think differently. The avatar's ability to swell and shrink in response to the dancer is interesting to the participants and one participant suggested that the offer to 'counter' or 'mimic' is exciting. This raises questions around the possibility of an avatar to act as an 'alternative mirror' and if so, how does one describe the potentiality between the dancer and the 'mirror'. Questions around identity and the subconscious were also discussed in relation to the blue blobby avatar. There is a tension with this avatar as it blurs lines of who is seen and who is being seen and raises questions around control. The avatar asks the users to see their own bodies in a new way and through this request blurs the line of perception and reality.

The Blending Engine is relevant to other disciplines and during the session it was discussed if the repository could be repurposed to support gesture analysis and movement therapists. Occlusion becomes relevant for some and the project and its tools were seen as having the ability to solve issues experienced in other fields like fashion, medicine and Human-Computer Interaction (HCI). As mentioned above, the blue blobby avatar inspired others to reflect on their own work. One participant, whose focus is in wearable textiles was struck by the fact that the avatar encouraged her to think about how she could play more with her designs and to

find a way to link the digital with these notions of space. Other participants suggested that cultural studies and other disciplines could use the blending engine to rethink and challenge notions of identity, the body and questions around gender.

Within a choreographic context, the results tell us that the blending engine may have a clear effect on how people view cultural dance and may open the possibilities to choreographing with dance genres they might not have considered. The repository of motion capture data was also seen as innovative and incredibly valuable and there were questions around how to 'build' and 'add to' the system so that it could continue to grow and be a hub for dancers and choreographers. There was an emphasis placed on the notion of making the tool and the content Open Access, as this could be seen as a real shift that could lure many artists from many other dance genres to choreograph in different ways. There were questions regarding multiple representations of the 'same' sequence/phrase which raises points of what makes a 'good copy' in the teaching process and how should this be evaluated. What is the new notation/grammar that can emerge through the project and that responds to and derives from/for mocap? Might this lead to new representations of dance in mocap and machine learning?

The final area that was of interest to many at the event was the actual motion capture data and how valuable this work is not only for the dance and performing arts practitioners but also for the mocap community. IP in relation to mocap data was another point made and how the WhoLoDancE repository could be a place to start exploring some of these questions. It is an area still underdeveloped and our data could lend itself to investigate some of these important issues.

Impact on the project

The impact that the evaluative session had on the project is that it offers Motek and the consortium clear feedback of the directions the blending engine tool should take and where resources could be allocated. Practitioners confirmed that the motion capture data and the blending engine is important to Machine Learning, HCI, the mocap community and the performing arts sector but further development on the tool is needed for it to be market-ready.

Chapter 3 Choreomorphy interaction system

Choreomorphy gives the option of choosing and customizing the visualizations of both dancer's body and movement, facilitating self-reflection and experimentation with different visualizations and avatars. Unlike most available digital dance learning systems, Choreomorphy is not a system, which asks from the dancer to imitate specific movements and provide a score. It rather aims at providing a variety of choices in visualizing movement based on imagery examples used in dance practice.

The system was evaluated through lab sessions with dance practitioners, designed with the following objectives: a) to serve as a formative evaluation of the user experience and interaction, b) to provide insight about desired features for the interface and avatars (human vs. non-human shape, human vs. non-human articulation, face characteristics), c) to explore the potential and impact of such a tool in an artistic, creative, and also educational context for dance practitioners that wish to experiment with visual metaphors and imagery.

Participants profile

The evaluation group consisted of 5 female and 2 male dancers, all with extensive experience in contemporary dance and improvisation. In particular, the participants were: one female contemporary teacher, choreographer and professional performer, one male professional performer and choreographer, two (male-female) graduate dance students and professional performers, two female advanced, amateur dancers with experience in contemporary dance, ballet and dance theatre, one female professional performer/actor with background in contemporary dance and somatic theatre.



Figure 13. Dance practitioners and experts using Choreomorphy
Photo credit: ATHENA

Evaluation procedure and setting

The participants were first provided with a brief introduction to the purpose of the experiment and asked to sign a consent form agreeing to be recorded through video, motion capture and audio. After wearing the mocap suit, each participant individually spent an average 60 minutes in the lab, experimenting with the tool through movement improvisation. No music was used in order to avoid additional bias and influence on movement. The users had been asked to comment, to change or skip a specific avatar if they wished to, and think aloud while dancing. After the movement sessions, each of the dancers has been interviewed briefly and then asked to complete an online questionnaire which consisted of a Likert scale user experience questionnaire with a few additional free text questions designed to capture different aspects of their impression of the tool.

For the quantitative part of our questionnaire, we used the UEQ - User Experience Questionnaire which foresees 6 scales measured through 26 questions in total. For our evaluation we used the five of the six scales as most relevant:

- Attractiveness: Overall impression of the product. Do users like or dislike the product?
- Perspicuity: Is it easy to get familiar with the product? Is it easy to learn how to use the product?
- Dependability: Does the user feel in control of the interaction?
- Stimulation: Is it exciting and motivating to use the product?
- Novelty: Is the product innovative and creative? Does the product catch the interest of users?

Attractiveness is a pure valence dimension. Perspicuity, and Dependability are pragmatic quality aspects (goal-directed), while Stimulation and Novelty are hedonic quality aspects (not goal-directed). The questions are seven point Likert-scale from -3 to 3.

Results of the evaluation

User experience and usability

As it is shown also in Table 1 and 2 presenting the UEQ results, users were enthusiastic with the UX aspect of the tool. As one of them noted: "I felt interest and curiosity, it was a completely new experience!" As it will be shown later in this section, the participants felt the experience was engaging and attractive, absorbing them in a novel way of experimentation through interacting with a virtual altered and augmented self.

Again, as shown from the results, the users, although positive, were more reserved with the pragmatic aspects of the tool (perspicuity and dependability), due to two main reasons, identified in the interviews: firstly, the environment of the lab and the idea of performing with the evaluators present, to them an audience not focused in the performance itself but on the technology was to a certain degree daunting and did not make them feel at ease; secondly and most important, the users did not feel in complete control of the experience. With the objective to have them focus on the performance, the evaluators were handling the control of the experience, with the participant's instructions. Most of the participants would have liked to be allowed to control the experience themselves and have some "alone time" with what was for them an exciting new piece of technology.

Impact and potential for dance performance

As already mentioned, the main strong point of the approach was that the different avatars were seen as an augmented mirrored-self that allows the users to see their movement but at the same time to distance themselves from their own self, emerging thus as a new character or moving creature. Therefore, as we expected, the different avatars created for the dance practitioners a creative, immersive experience which stimulated their movement improvisation. Most of the participants explained that this marginal perception of the avatar as their own self was a motivation to new movement patterns.

It was interesting that a kinetic relation was forming between the physical and virtual self, as sometimes they felt as the avatar was leading and vice versa, although in fact it was always their own movement that was reflected. One of the participants noticed: "At some points I felt like the avatar was not me, but that I was initiating its movement. I became more and more curious about moving in different ways and trying to affect the visualizations." Another participant adds, "I was surprised when I saw myself through the avatars. I was trying to move depending of the shape which I was seeing every time. Each avatar triggered me in a different way. So, my movement was affected by the avatar. I really liked it, because I was discovering all the time new movements." An interesting aspect to further investigate is the perception of the "empathic" relation gradually forming between the dancer and the avatar. As one of the male performers notes: "At the beginning the emotions were not connected at all between the avatars and me. It was kind of separate things, the avatar and me. But then, very empathic, narcissistic, playful and equal emotions started to trigger between the avatars and me."

Some participants reflected on how the Choreomorphy interactive experience allowed them to move in a new body, with different size or different gender. One of the professional female performers, who is also a choreographer and dance teacher, noticed: "I'm a small shaped dancer, so seeing myself as a bulky avatar with big volume, was an interesting experience and triggered me to move in new ways". While a young male

choreographer and dancer comments: "Seeing myself dancing as a female avatar was an interesting and strange feeling. It was amazing! I like the fact that most of the avatars were gender neutral. I was mostly intrigued by some avatars where the human shape was distorted, I would like to play more with this aspect".

In addition, dance experts commented on the way the visualizations, allowed them to actually see, what in the real world can only be imagined through imagery techniques: "It was great playing with the traces and the trails. Usually in the dance studio you get instructions of trying to imagine the shape of your movement traces, the trajectories, but with this tool I could actually see them!"

The moment of changing from one avatar to another was always a moment of excitement and a focus of attention for the dancers. Last but not least, it was interesting to see how the usage of the system by each one of the individuals, revealed something about her/his dance practice. For example, one of the performers who never uses the mirror in his practice, preferred to not look directly on the screen while dancing but to use more his peripheral vision. The performer who had also an acting background, improvised with voice and speech and explained that she would like to produce also different voices and sounds while moving through the avatars.

Pragmatic and Hedonic Quality	
Attractiveness	2,51
Hedonic Quality	2,02

Table 1. Results on hedonic quality

UEQ Scales	
Attractiveness	2,514
Perspicuity	0,571
Dependability	0,583
Stimulation	2,571
Novelty	1,476

Table 2. Results on the five selected UEQ scales, in the range of -3 to 3

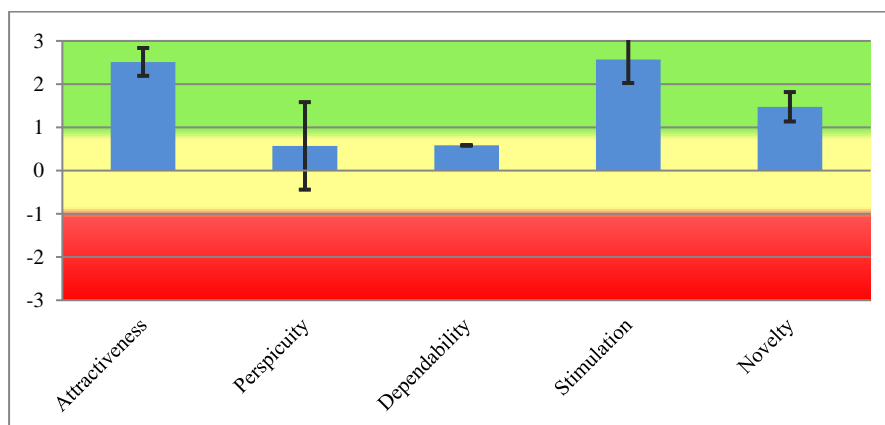


Figure 14. Results of the evaluation regarding the different elements of UEQ

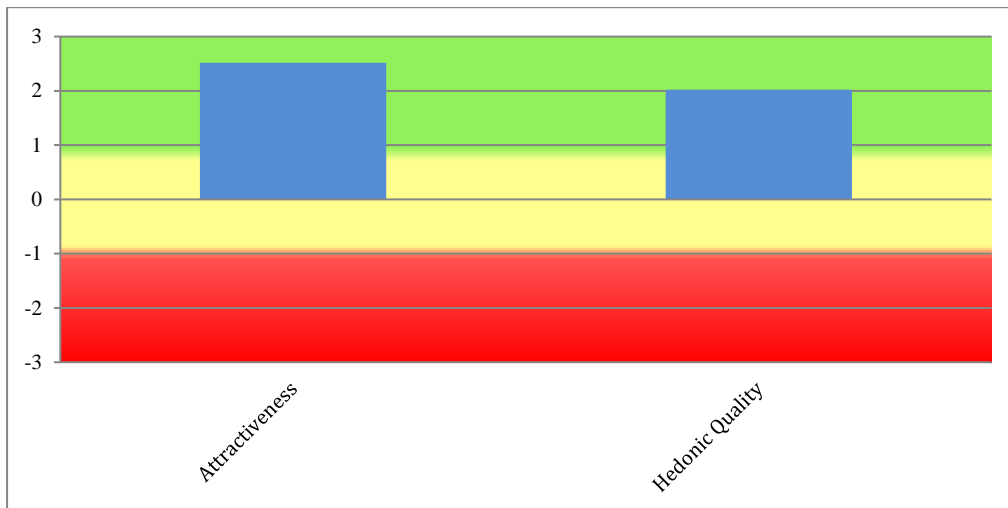


Figure 15. Results of Choreomorphy evaluation with dance experts

Impact on the project

The contribution of the system in the area of digital applications for dance, according to the practitioners, is two-fold. Firstly, Choreomorphy goes beyond the limits of existing dance education systems which are based on a mimesis educational approach, suitable mostly for beginner dancers. Choreomorphy is based on imagery techniques to promote a reflexive approach addressed to more advanced practitioners. The rich controls for fine tuning the avatar, scene and movement visualization characteristics, during the session in an un-interrupted way is the second main contribution of the tool. The system provides an intuitive interface that can be used by the practitioners' themselves or their assistants (choreographer, teacher, co-dancer) to experiment in one session with different combinations of visual effects.

In addition, considering the importance of imagery in dance practice, Choreomorphy can be applied to digital improvisation sessions to advance research on dance movement by exploring the impact of body and movement representation in digital environments and inform requirements regarding the avatar characteristics (anthropomorphism, textures, shape, gender, etc.) and how that may have influence on movement improvisation.

Working together with dance experts with the tool, revealed that the experience of the dance practitioners seeing their own movement in real time through different visualizations can have a deep effect on their practice and cannot be compared to seeing recorded movements through the same avatar.

K4. Would you envision using this tool in the classroom/dance studio?

7 responses

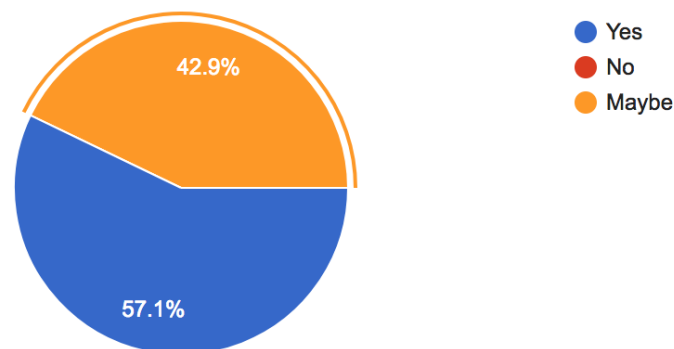


Figure 16. Responses about using Choreomorphy as a tool in the dance practice

Chapter 4 WML usability evaluation

Description of the tool

The main objective of the WhoLoDance Movement Library (WML) application is to provide access to the WhoLoDance repository, through a usable interface with browsing, searching, visualization and annotation functionalities for the multimodal recordings.

More specifically, the user can browse the recordings by dance genre, and search by using keywords that are included as metadata of the recordings. A special player has been developed, so as to allow the synchronised playback of a video, as well as its corresponding motion capture file. Moreover, not only do users have the opportunity to view the recordings but also to annotate them. Finally, a timeline that operates as viewer for the annotations has been developed.

Method

For the usability evaluation of the WML platform a task-based user evaluation in a laboratory setting has been organized.

Seven usability and UX experts were invited to participate in the evaluation.

After a brief introduction to the project and signing of consent forms, without initially making clear the objective of the platform, the users were asked to freely navigate in the platform and to express their opinion as to what the function of the platform is. Our objective was to verify whether the interface makes clear the objective of the tool. The evaluators to this end asked to the participants questions like:

- What do you think this tool is used for?
- What would you expect to be able to do with it?

After the discussion the users were introduced with more details about the platform and presented with its main functionality and were given a series of task to perform, while they were observed by the evaluators.

The following tasks were given to the users.

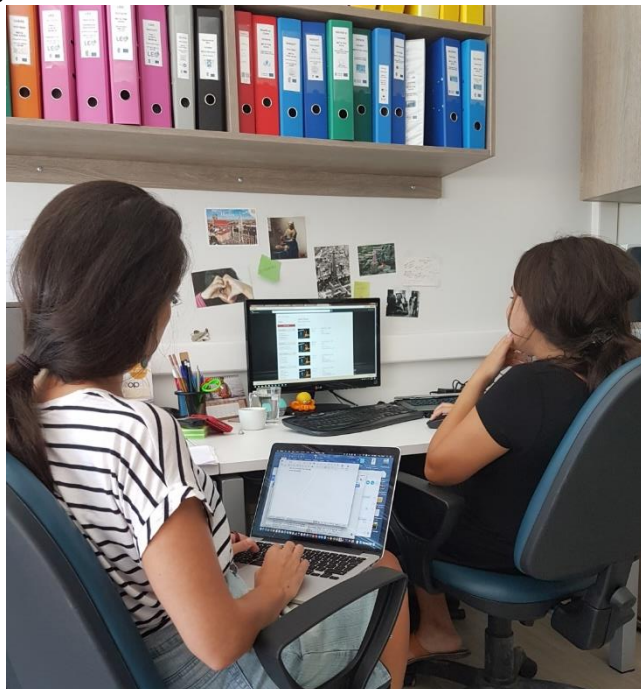


Figure 17. WML evaluation

Task 1 Search/browse by dance genres and metadata

- Find all the recordings that are related to Greek Dance.
- Check how many are these recordings.
- Find the recordings of Greek Dance that Konstantinos and Pavlos are the performers.
- Choose “Nizamikos full”.
- Observe the existing annotations on the timeline. Explain them to the evaluator.
- Zoom in the 3D motion capture of the movement to examine the details of the movement.

Task 2: Search for specific recordings and annotations

- Search for the Greek dance recordings to find the one which has the largest number of annotations
- View the annotations which are added to this sequence. You are interested only in labels referring to the Movement Qualities (fluid, rigid, fragmented, heavy, light, sustained, sudden).
- Examine the different labels and values that are added to the different qualities to find the segments that are characterised as Heavy with value ≥ 5 .
- You are asked to see existing annotations regarding Movement Qualities applied on Greek dance recordings and study how the different qualities are interpreted by different dancers. Check the value of those annotations, zoom in and read carefully the annotations to check if there is a segment where the movement is characterised both as “light” and “heavy” by different users.

Task 3: Working with the timeline

- Let’s say that you are a Ballet teacher and you want to explain by showing examples how the different Movement Principles apply in the exercises of ballet which include jumps. Search for a sequence that comes from Ballet which contains at least one “jump”.
- Select sequence “centre jump 04 J 001”.
- Observe how the segment where the “jump” takes place is characterized (or not) with specific Movement Principle Descriptors (Symmetrical, Coordinated).
- Check how many of these annotations have been added by the same user.

Task 4 - Add new annotation

- Look for the Sequence “solo compas allegrias 01” of Flamenco dance and add the label “Arm Gesture” (action) referring to the segment 2:03 to 2:07.
- Now add another label “Sustained” (Movement Quality) on the same segment referring to the Arms (Body Parts) and add value 9
- Finally add on the same segment a Free text label of your own choice “MyAnnotation”
- Check if the labels appears on the timeline
- Search MyAnnotation from the search text box
- Now you have changed your mind and want to change “MyAnnotation” into “Myexample” Edit the annotation.

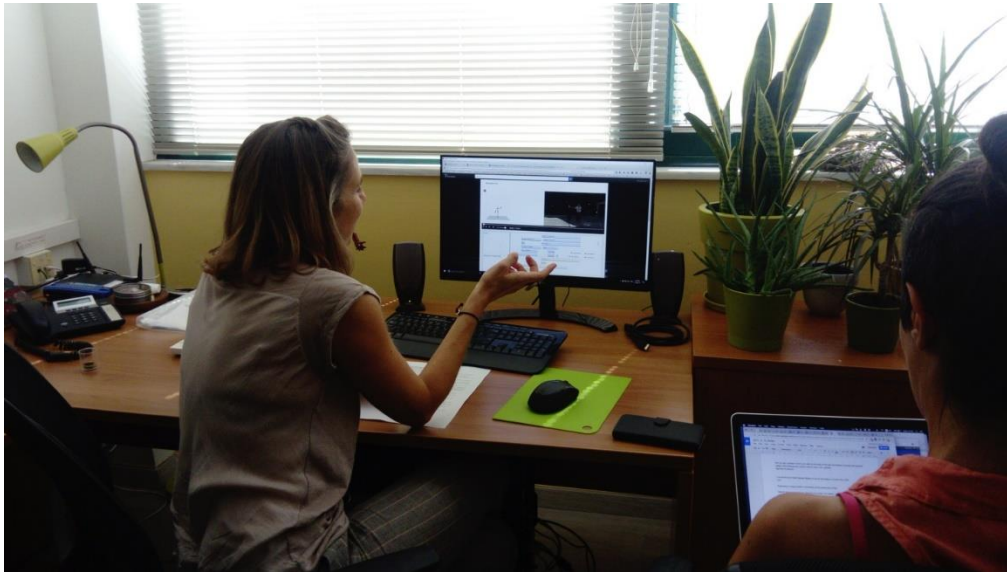


Figure 18. WML usability evaluation – discussing the annotations table and timeline

Results

The results of the evaluation, including user observation and notes during the testing, interviews and questionnaires have been analysed leading to qualitative and quantitative results. What follows are a series of examples of data which are combination of questionnaires and interviews carried out with the participants.

User experience questionnaire results

The UEQ contains 6 scales (-3 to 3) with 26 items:

- Attractiveness: Overall impression of the product. Do users like or dislike the product?
- Perspicuity: Is it easy to get familiar with the product? Is it easy to learn how to use the product?
- Efficiency: Can users solve their tasks without unnecessary effort?
- Dependability: Does the user feel in control of the interaction?
- Stimulation: Is it exciting and motivating to use the product?
- Novelty: Is the product innovative and creative? Does the product catch the interest of users?

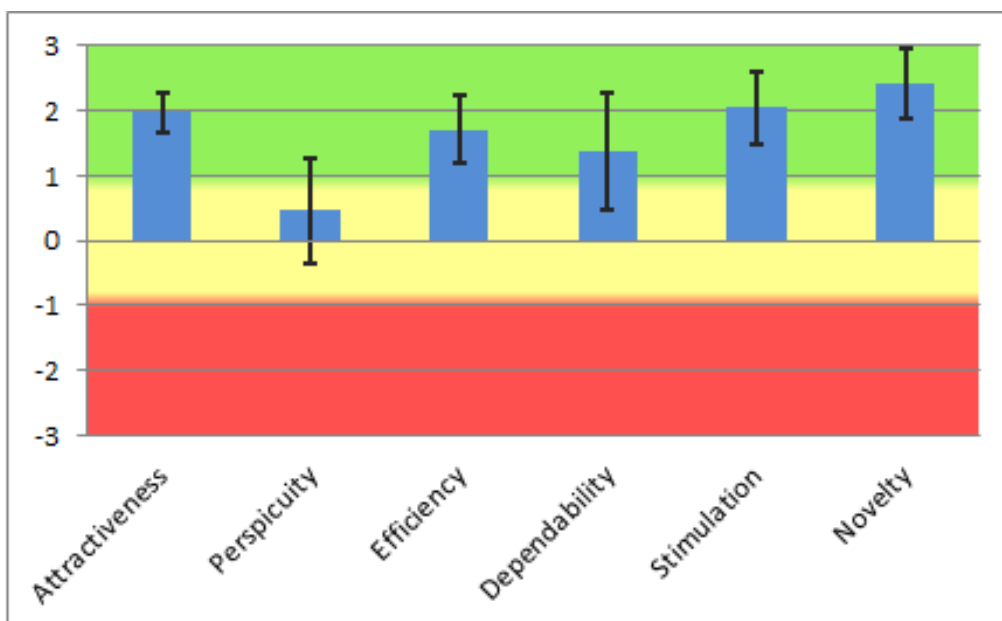


Figure 19. WML Usability UEQ results

UEQ Scales	
Attractiveness	1,972
Perspicuity	0,458
Efficiency	1,708
Dependability	1,375
Stimulation	2,042
Novelty	2,417

Table 1. WML UEQ Scales results

The scales of the UEQ can be grouped into pragmatic quality (Perspicuity, Efficiency, Dependability) and hedonic quality (Stimulation, Originality). Pragmatic quality describes task related quality aspects, hedonic quality the non-task related quality aspects. Below the mean of the three pragmatic and hedonic quality aspects is presented.

Pragmatic and Hedonic Quality	
Attractiveness	1,97
Pragmatic Quality	1,18
Hedonic Quality	2,23

Table 2 WML results grouped in pragmatic and hedonic qualities

Results confirm the success of the tool in all scales except perspicuity. This is to be expected as the tool is complex and it can be initially daunting to the unfamiliar user, requiring some time to get familiar with it.

User observation and interviews

In general users were very positive with the platform current state in terms of design and functionality. Considering the complexity of the platform functionality, users were able without even minimum training and instructions to navigate within the tool and complete simple tasks.

- They felt that the design is aesthetically very nice.
- All users were able to understand the objective of the tool.

The users however offered insight on improvements on the tool at different levels. The user recommendations are presented in Appendix Table 3.

The analysis of the evaluation results led to the improvement and re-design of specific features of the tool leading to its new version released in November 2017.

WML evaluation at the Athens Researchers' Night workshop

The WML has been evaluated in a targeted Workshop organized in the context of the Athens Researcher's night event by the ATHENA team on the 29th of September. The WML Workshop lasted two hours and was addressed to dance experts and practitioners.

Nine participants attended with the following profiles:

- 1 Choreographer and Dance Teacher (Contemporary, Improvisation)
- 3 dance researchers focusing on digital technologies related to dance

- 1 Dance Researcher, Labannotator, Dance Anthropologist
- 1 Dance Teacher (Improvisation, Contemporary)
- 1 Director of dance theatre
- 2 professional level dancers (Greek folk dance)

After a presentation of the WhoLoDance overall approach and the objectives of WML, the participants were asked to freely experiment with the tool individually or in pairs for 45 minutes, with the support of the ATHENA when requested. During this session comments and questions of the participants were recorded and interesting discussions were issued between the participants. After this session the participants were asked to fill in a questionnaire and another 45 minutes were dedicated to focus group discussion about the platform.



Figure 20. WML Workshop – Experimenting with the platform

The following table and figure summarize the participant outlook for WML. They felt it was usable, clear and useful and proposed extensions and improvements.

Question	Average in a scale of 1 to 5	Comments
Are the search filters useful in retrieving the desired information?	3.6	Additional proposed filters: body parts, joints, movement quality
Do you find the information describing the recordings sufficient for understanding what the recording contains?	4	

Would you suggest WML to other professionals in your field?	4	
Did you find it easy to use?	4	
Did you need support to use it?	2.2	
What improvements would you propose?		<ul style="list-style-type: none"> • Given the option to pick an avatar from a selection. Each avatar should reflect specific qualities. Maybe categorise the avatar according to qualities that you want to focus on. • The avatars may become more detailed regarding the movement of specific body parts (i.e. hands, fingers) • Use the full vocabulary based on your research on the qualities of movement

Table 3. WML Workshop - summary of questionnaire results

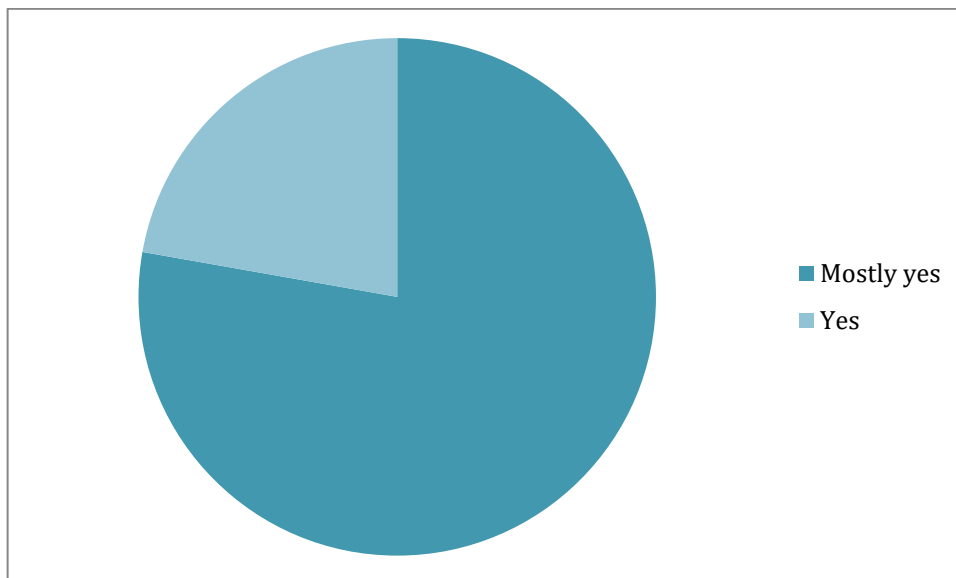


Figure 21. WML Workshop - questionnaire results - did the WML platform function?

Conclusion

In summary, the various evaluative events and workshops that have been carried out by COVUNI and ATHENA have offered useful feedback to the Consortium. The teams have gathered qualitative and quantitative data that identify key areas of focus that have been fed back to the technology developers. The events and workshops suggest that we are indeed providing a series of useful tools that enhance, support and positively affect the process of dance making and dance learning.

References

Sarris, N. and Strintzis, M. (2005). 3D modelling and animation. Hershey: IRM Press.

APPENDIX



Certificate of Ethical Approval

Applicant:

Karen Wood

Project Title:

Whole-Body Interaction Learning for Dance Education Project (WhoLoDancE)

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk

Figure 22. Certificate of Ethical Approval

Participation Information

WhoLodance

Study title: WhoLodance

What is the purpose of the study?

The purpose of the study is to interview you as a dance professional. The study will result in publications (text/video/online) and new technologies which will explore new methods for teaching and learning dance, and choreographic practices. The aim of the project is to develop and apply breakthrough technologies to dance in order to investigate bodily knowledge, preserve cultural heritage, innovate teaching and widen the access and practice of dance.

Why have I been approached?

As a dance professional involved in the project, we are keen to find out about your experiences. Your journey through your creative practice will provide valuable insights which will be of direct benefit to the research.

Do I have to take part?

No. Participation in the research is entirely voluntary. If you change your mind about taking part in the study you can withdraw at any point during the research and at any time in the two weeks following that session by contacting me using the email address stated below. There are no consequences to deciding that you no longer wish to participate in the study.

What will happen to me if I take part?

You will be invited to take part in an interview, which will be between yourself and a member of the project team. You may be invited for a follow-up interview or to take part in a focus group, which will feed into the research.

The interview may be conducted via Skype or in person. The interview may be filmed and/or audio recorded for the purpose of maintaining an accurate account of the discussion. The recordings will be transcribed and may be used as a source for writing up the project.

What are the possible disadvantages and risks of taking part?

One disadvantage is the time taken for the interview, and any follow-up discussions but I will try to keep this to a minimum and provide sufficient time for you to participate, taking into account any special requirements you have.

What are the possible benefits of taking part?

You will have the opportunity to reflect on your work and be involved in influencing new technologies in the area of dance practice. One aim of the research is to understand what principles you use when teaching dance, which will inform how the technology is developed; you will contribute to this and benefit from any technologies that emerge out of the project.

WhoLoDancE Consent Form
EU Funded Project H2020

The Consent Statement

Participant Reference Code: WHL/ _____

I have read and understand the attached participant information sheet and by signing below I consent to participate in this study.

I understand that I have the right to withdraw from the study without giving a reason at any time during the study itself.

Signed: _____

Print Name: _____

Witnessed by: _____

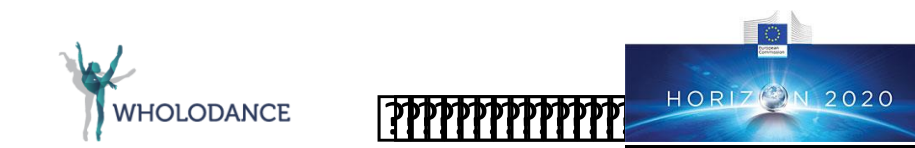
Print Name: _____

Researcher's Signature: _____

Figure 24. Participant consent form

Interview Questions WhoLoDance	
Date/Time/Location	
Interviewee	
Interviewee's Role/Position/Dance Genre	
Interviewer	
Question	Notations
Career Development	
What is your moving/movement background?	
What dance training have you received?	
When did you take your first class and in which country?	
What were the factors that made you want to teach?	
In what ways did your training help you to think about your body?	
Do you create your own performance work?	
What factors create barriers to you making and performing?	
Movement Principles	
Out of this list of Movement Principles (have separate list to show?), choose 2/3 that you use in your teaching the most/are the most significant for you?	
Out of this list of Movement Principles (have separate list to show?), choose 2/3 that you think about when performing/have the most value for you as a dancer?	
Now please choose one that resonates with you the most.	
Do you use imagery when you teach/perform/choreograph?	
What types of imagery do you use? (e.g. Anatomical, biomechanical, metaphoric, kinesthetic. Can you give examples?)	
Relationship with Technology	
Do you use any tools such as video or interactive technology in your making/teaching/performing?	

Figure 25. Question set distributed to participants for Deliverable 1.2



WHOLODANCE

Whole-Body Interaction Learning for Dance Education

Call Identifier: H2020-ICT-2015 Grant Agreement No: 688865

Topic: ICT-20-2015 Technologies for better human learning and teaching

INFORMATION SHEET

?

Website: <http://www.wholodance.eu/>

Principal Coordinator: Edwin Morley-Fletcher

Coventry University Centre for Dance Research Team Lead: Prof. Sarah Whatley

?

Overview: The aim of the project is to create new technologies for capturing and analyzing dance movement to facilitate whole-body interaction learning experiences for a variety of dance genres. WhoLoDance will explore smart learning environments for providing dance students with adaptive and personalised learning and assessment, through multi-modal/multi-sensory interaction technologies and advanced immersive realtime training interfaces. Wholodance aims at developing and applying breakthrough technologies to Dance Learning in order to achieve results that will have relevant impacts on numerous targets including, but not limited to, the dance practitioners ranging from Researchers and Professionals to Dance Students and the Interested Public to those working in dance.

?

Wholodance focuses on five main objectives listed:

- Investigate bodily knowledge
- Preserve the Cultural Heritage
- Innovate the Teaching of Dance
- Revolutionize Choreography
- Widen the access and practice of Dance

?

Consortium (10 Partners): Lynkeus (Italy), Athens Uni (Greece), Motek (The Netherlands), Milano Poly (Italy), Peachnote (Germany), Uni of Genova (Italy), STOCOS (Spain), kDanse (France), Cov Uni, Lyceum Club of Athens (Greece)

?

Videos on the project:

Prof. Sarah Whatley overview of project: <https://vimeo.com/185778004?from=outr-embed>

MOTEK Entertainment Company-tech partner overview: <https://vimeo.com/185622624>

Motion capture session: <https://vimeo.com/185616664>

Figure 26. Project Information Sheet distributed to participants for ImpaKT Report interviews



WHOLODANCE?

Whole-Body Interaction Learning for Dance Education

Call Identifier: H2020-ICT-2015 Grant Agreement No: 688865

Topic: ICT-20-2015 Technologies for better human learning and teaching

Interviews for ImpaKT project 2017

Question	Answer
What kind of tool or application would assist them in their work (or would they imagine dancers/teachers/etc would want) – what would the 'dream' be?	[Redacted]
Would they use the blending tool (if seen having value for the dance community)? If so, what for?	[Redacted]
Hololens – is this attractive/interesting to them to use in a studio context? Any other context?	[Redacted]
What impact do they think these tools/apps will make to their work – might it change the way they work in the future?	[Redacted]

Figure 27. Question set distributed to participants for ImpaKT Report interviews

4/9/2017

ChoreoMorphy Evaluation

ChoreoMorphy Evaluation

This questionnaire is held by the Hubic Lab of the Institution of Language and Speech Processing (ILSP) at the Research and Innovation Center "Athena" for the project "Wholodance". The participation to the questionnaire is anonymous and the results will be used for research and non-commercial purposes. You can give us your email in case you are interested in the results and further updates of our research. Please do not hesitate to ask as for more details if needed!

*Required

1. 1. What is your relationship to dance? *

Tick all that apply.

- Professional Dancer
- Dance Student
- Choreographer
- Dance Teacher
- Performer
- Other: _____

2. 2. What dance training have you received? *

Mark only one oval.

- Professional school/Higher Education
- Amateur School
- Other: _____

3. 3. What are the dance genres-techniques you teach and/or practice: *

Tick all that apply.

- Contemporary
- Ballet
- Improvisation
- Dance theater
- Greek Folk
- Other: _____

4. 4. Gender *

Mark only one oval.

- Male
- Female
- I prefer to not specify

A. Abstract anthropomorphic avatar with textures

Note: for the evaluation will be useful to show the admin account that shows many annotations.

Pre-evaluation questions

We need to verify whether the interface makes clear the objective of the tool.

What do you think this tool is used for?

What would you expect to be able to do with it?

Introduction to the tool and the tasks

The user is demonstrated the main functionality of the tool.

Task 1 Search/browse by dance genres and metadata

- Find all the recordings that are related to Greek Dance.
- Check how many are these recordings.
- Find the recordings of Greek Dance that Konstantinos and Pavlos are the performers.
- Choose "Nizamikos full".
- Observe the existing annotations on the timeline. Explain them to the evaluator
- Zoom in the 3D motion capture of the movement to examine the details of the movement

Task 2: Search for specific recordings and annotations

- Search for the Greek dance recordings to find the one which has the largest number of annotations
- View the annotations which are added to this sequence. You are interested only in labels referring to the Movement Qualities (fluid, rigid, fragmented, heavy, light, sustained, sudden).
- Examine the different labels and values that are added to the different qualities to find the segments that are characterised as Heavy with value ≥ 5 .
- You are asked to see existing annotations regarding Movement Qualities applied on Greek dance recordings and study how the different qualities are interpreted by different dancers. Check the value of those annotations, Zoom in and read carefully the annotations to check if there is a segment where the movement is characterised both as "light" and "heavy" by different users.

Task 3: Working with the timeline

- Let's say that you are a Ballet teacher and you want to explain by showing examples how the different Movement Principles apply in the exercises of ballet which include jumps. Search for a sequence that comes from Ballet which contains at least one "jump".
- Select sequence "center jump 04 J 001".
- Observe how the segment where the "jump" takes place is characterized (or not) with specific Movement Principle Descriptors (Symmetrical, Coordinated).
- Check how many of these annotations have been added by the same user.

Figure 29. Tasks distributed to participants for Choreomorphy Evaluations

WML Usability evaluation – User recommendations

Functionality	Issue - recommendation
Main page	Search box is not obvious
Main page	“Information scent” is needed on the main page to clarify the objective of the platform, maybe as the subtitle on the main page: “It looks maybe like the first question of a quiz the way it is now... Maybe frame it like ‘choose a dance genre’ or ‘Browse, search and view over 1000 annotated dance movements’”
Main page	Some info in the homepage for each dance genre (on hover)
Main page	The differentiation between dance genres is not clear. All photos are black and white and photos not representative of the genre. Maybe different photos could be used or colour coding around the photo.
Main page	A menu tab with the category, that will give the option to browse by Genre as in the Home page.
Search page	There is no back/home button to the main page
Search page	Breadcrumb says, “All recordings”: there should be an option with the current results.
Search page	Sort was not clear. Sort by last updated/ which can refer to the date of the last annotated (it shows the dynamic usage of the Movement Library/ that is used, live, update)
Search page	Autocomplete is needed in the search box
Search page	Some info is needed for the metadata items of each recording, e.g. Performer: Muriel
Search page	Pagination line should be centred and wider.
Search page	When the filters are cleared it is not obvious that the page is loading.
Search page	Filters should be re-examined and possibly their mechanics re-designed. The filters with 0 results are confusing.
Search page	The button to filter should be at the bottom, currently it looks like a title to the filters.
Search page	Filters should include Categories and maybe Labels too
Search page	Some users could not understand the x symbol near the filters, they would prefer “clear filter” instead
Viewer	Some users would like the table and timeline to interact. At the moment it is not clear how the annotation functionality is split between the two.
Viewer	The Viewer should offer possibility for the Timeline and Video to be visible at the same time without scrolling. (The Swap icon that changes the position of the Timeline and Table was not obvious
Viewer	The metadata should be also visible in the recording page.
Viewer - Mocap	The mocap controls should be clearer. The i on the mocap window is in a position that occludes the mocap.

Viewer - Mocap	Some users would like to be able to expand in full screen mode the video and mocap.
Viewer - Mocap	Some users would like to be able to zoom in the mocap and video simultaneously
Viewer - Mocap	Buttons for zoom in/out should be added
Viewer - Table	The sort option in the annotation table sorts only the current page and not all the pages
Viewer - Table	Search results have the previous pagination at the bottom of the table
Viewer - Table	The value slider is confusing, it should be a drop down
Viewer - Table	The Table column title is not the best place to place an Add annotation button, it is not clear in that position. An alternative should be investigated.
Viewer - Table	Alignment in Add annotation columns should be improved.
Viewer - Table	The search box of the annotation table should have "search annotation" in the background, not "search the table"
Viewer Timeline	- It is not clear that start and end time are initialized by the current position of the player's cursor.
Viewer Timeline	- Timeline is confusing when empty
Viewer Timeline	- Arrows on the timeline (shown only on hover) instead of the arrows below
Viewer Timeline	- The user is missing from the Timeline
Viewer Timeline	- The fact that you have different annotations from different users on the same thing may not be clear to the user.
Viewer Timeline	- Add annotation should be possible in the Timeline
Viewer Timeline	- It would be good if when i click an annotation in the timeline the slider goes there (U4)
Viewer - Table	Users felt that it is strange that you have to click on the timeline in order to enable the on over effect.

Table 4. WML Usability evaluation – User reported issues and recommendations