O1: DESIGN THINKING FRAMEWORK

RHYTHM4INCLUSION

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Nature of the deliverable		
R	Report	**R**
Dec	Websites, patents, filling etc.	
Dem	Demonstrator	
O	Other	

Dissemination Level		
PU	Public	**PU**
CO	Confidential, only for members of the consortium (including the Commission Services)	

Type of Activity		
IO	Intellectual Output	**IO**
A	Project Management and Implementation	
M	Transnational Project Meeting	
E	Multiplier Event	

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V4	10/08/2019	All	Survey analysis
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V6.	20/08/2019	All	Final version

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1 EXECUTIVE SUMMARY

This report presents the design-thinking methodology along associated processes and strategies for collecting data on how the rhythm-based curriculum, the digital competency framework for rhythm-based teaching with the use of technology is understood and experienced from the users' point of view. We perceive as central to out understanding of how such a complex and ill-defined process as rhythm through dance and music could be instantiated in the classroom from teachers themselves and what are the enablers and challenges in adopting rhythm-based teaching and learning in European schools. Certain user-centred strategies have been deployed as means to extract user-centred data such as a participatory workshop in Rethymnon, Greece where all partners' have used interactive tools such as game cards to sketch, ideate and brainstorm how rhythm-based learning would appear to, and orchestrated in, real-classroom settings. In conjunction to this, we have designed a survey asking teachers from the participating countries to respond to questions that would help us design and develop, in a user-centred way, the rhythm-based curriculum, the Rhythm-based digital competency framework and the online courses. We then analysed the data from the questionnaire resulting to structured outputs that will be the backbone of the development of our products and services. We propose a set of recommendations to be considered when developing the outputs as described in the associated intellectual outputs.

2 INTRODUCTION

As part of O1 this deliverable aims to present the overarching human-centred methodology we employed to elicit user-requirements for the Rhythm's project outputs. In particular, we attempt to extract user-centred data about how primary and secondary-education teachers experience teaching with rhythm-based learning, how they perceive the development of digital literacy skills and competencies and how they would value the development and implementation of a rhythm-based curriculum in their classroom as well as challenges and benefits they would anticipate in orchestrating a rhythm-based curriculum in their classroom. To this line, the key questions that we aim to answer in this report are:

1. How teachers experience teaching with the use of rhythm-based instruments such as music and dance?
2. How teachers experience the development of a framework for developing and assessing rhythm-based digital competencies and skills?
3. How teachers experience the design and implementation of a rhythm-based curriculum in their own classroom context?

We start by presenting and analysing our user-centred and participatory framework, design thinking, entailing a structure for identifying the problem-base and start contemplating on the solution-space. This stage-based model is human-centred, convergent-divergent and service-product oriented to hell us think and act as designers of our own products and services from creating to implementing and

testing involving both the acquisition of information and knowledge from user data but also developing a sense of emotional intelligence and empathy on the work we are trying to complete.

After perpetuating on design thinking, we present the process of organising and implementing the C1 workshop in Crete as a user-focused data collection instrument that assisted us to gather experiences, opinions and ways of understanding rhythm-based learning and teaching.

In what follows, we explain how we investigated background knowledge on rhythm-based learning, digital competency skills and significance of the rhythm-based curriculum in different subject areas, predominantly for inclusive teaching including students with special needs across different backgrounds and domains. In conjunction to this we elaborate on the data collection methods we used to elicit user-centred data on rhythm-based teaching and then we present the findings for (1) teaching using rhythm-based learning, (2) digital competencies and skills for rhythm-based learning and (3) experiences on the rhythm-based curriculum. Finally, we discuss a set of recommendations to constitute the backbone for developing the foreseen outputs in O2, O3 and O4.

3 DESIGN THINKING FOR RHYTHM-BASED TEACHING AND LEARNING

There is evidence from a number of commentators from academia and the industry sectors that design thinking involves research-oriented instruments, processes and practices for solving specific problems encountered from individuals or a group of people. It is often related as a process used by designers to experience and understand design situations that would necessitate certain iterative stages for completing the design of a specific product or service. Design thinking encompasses research-based practices as it is driven by core fundamental principles that involve the extraction of user-generated data as means to understand how humans would interpret, conceptualise and experience a product or a service. Design thinking is a developmental, experiential and constructive paradigm that helps designers to identify, capture, analyse and interpret the needs, feelings, beliefs, conceptions and experiences of the people who are going to use the product or the service.

With deep roots in architectural and product design, design thinking is now employed from an array of different sectors including educational and business organisations. Education has embraced design thinking because it may be used as a comprehensive methodology to help students to have a structure when attempting to explore, learn and create. The industry is using design thinking not only as a paradigm to understand users' needs but also as a vehicle to boost innovation. ***The R4I project defines design thinking as a human-centred process that will be used for understanding teachers' practices, beliefs, conceptions and experiences in using rhythm emanated in dance and music activities and their digital competencies for improving their teaching and learning practice***. The design-thinking outcomes will be relevant to the characteristics of our target group including their current experiences of teaching, their understandings of how rhythm may enhance learning and their associated digital competencies and literacies as means to teach our rhythm-based curriculum employing digital technology. We will use design thinking therefore to design rhythm-based experiences emanated in data derived from our end-users (i.e. teachers) that will enable us to think deeper about how we will be able to design a rhythm-based curriculum that would provide the means for improving learning and teaching. Recognising patterns through observations, jotting down ideas and connecting them with other concepts and being emotionally stimulated by experimenting

with different processes, tools and methods for making sense of how our target group conceive and approach rhythm as a novel approach to teaching and learning.

Our aim is to forge a design mindset to our participating teachers and rhythm dancers and educators as means to acquire an action-oriented approach for a participatory approach to designing the rhythm curriculum, the online training programme and the digital competence assessment framework. Our approach to design thinking draws on research-based practices, inquiry-based learning, imagination, creativity and methodical reasoning to identify new horizons of what could be an innovation for teaching and learning with a rhythm-based intervention.

The basic reasoning pattern that we will use as a formula is derived from an abduction reasoning pattern through which the what (thing) and how (process) leads to an aspired value (Dorst, 2011). We also embrace a more open form of reasoning where the 'what' (the object of creation) and the 'how' (the process of creation) is unknown whereas the only known is the aspired value. As the nature of design is ill-defined and creates an added perplexity when it is enacted in non-designing contexts, it often may seem to introduce ramified situations where people may feel intimidated to share experiences, beliefs and actions by getting involved in design-like activities that actually involve the externalisation of thoughts and experiences through designing, brainstorming, building, prototyping and testing. Likewise, it may seem problematic to apply design-based activities in the education disciplines as means to design lesson plans that are closely aligned with learning tasks closer to real-life problems. Creating ideas and finding solutions is the sine-qua-non-aspect in the designing paradigm contextualised to the needs of specific people. The overarching principle of applying design thinking is to offer a tangible solution to a highly open and complex problem. Related methodologies and approaches are completed with design thinking as means to tackle this highly complexified situations such as problem-solving and inquiry. The problems manifested from a design-like perspective normally require interactions and participation of end-users and other stakeholders in order to be solved in a more exogenous way than the way scientific reasoning approaches the solution of a problem using more inductive / deductive methods for reducing complexity

3.1 THE DESIGN THINKING STAGES

The R4I design thinking approach employees a dualistic perspective in a sense that both the problem and the solution are perceived as a process of investigation and exploration. Design thinking is also an interplay between convergent and divergent thinking, that may start in random sequence, either only as diverge without necessarily following converge or converge without following diverge or both diverge up to a point and then converge (Fig.1).

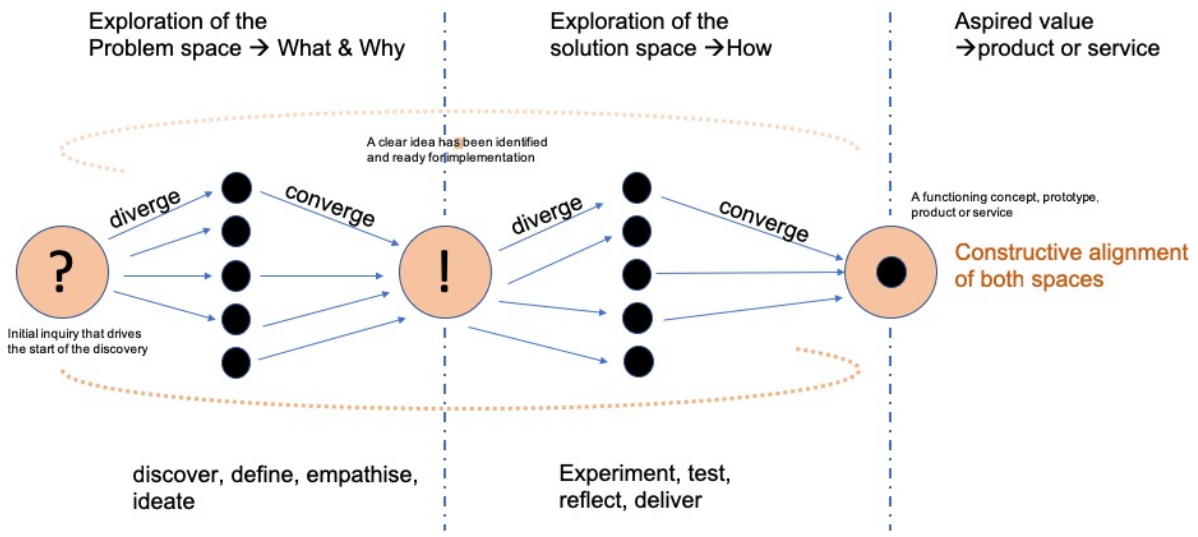


Fig. 1: The R4I approach to abductive design thinking starting from understanding the problem space (the What and the Why) and then constructively exploring the solution space (the How) which would lead to the aspired value (the actual product or service

Learning about the problem is the first stage of the process and then learning about the solution is the next stage for constructing the totality of the aspired concept, product or service. Exploring the problem space involves mainly understanding how potential users experience and understand the problem, how it is being defined, how it being approached and creating a feeling or a sentimental approach towards the problem experienced by others. Attempting to visually represent the problem by diverging and converging concepts and ideas as opposed to making assumptions from hypothesis or from consolidating theories is the main focus. Once a clear problem or idea has been identified, then it is time to start exploring the solution space. Design thinking is about transforming the problem or idea into a tangible 'thing' that would be visible and entail a substance so users can experiment with it, see its pitfalls, understand the structure, experience its texture, testing and prototyping whilst constantly reflecting on what needs to be improved, rethought or re-configured.

Delivering at this stage it is the stage where the product or service is delivered to the user for providing further feedback on aspects that have not been identified from the design forging a constant iteration process between the design team and the end-users. The constructive alignment between the problem and solution space endows a constant effort to involve the end-users to provide feedback on both conceptual and tangible representations at every stage of the process. The process of constantly informing all the ideas, concepts, products and services emanated from both spaces may be used for constantly refining, revising and updating all outputs of the design thinking approach starting from the stages for identifying the problem path and then adjusting the tangible representations produced in the solution space. **For R4I this is a key aspect as it engenders a system of revising, amending, checking and balancing the initial concept idea with the actual tangible service that the project will deliver**.

3.2 DISCOVERING THE PROBLEM

We will adopt design thinking as a user-centred and participatory approach for understanding the needs of our end users in terms of (a) the rhythm-based curriculum (b) the digital competencies and skills framework. During our training and multiplier events, we will engage our users into a process of communally understanding what are their experiences in rhythm and dance and how they envisage a curriculum that focuses on rhythm for helping students to understand their inner-processes of learning, their body functions and how to employ a creative mind-set for solving real-world problems. We will start by exploring the problem space and setting the initial inquiry questions to initiate the discovery. The primary questions to be posed to the end-user to commence the discovery process (see figure 1) are the following:

1. **What do you mean by teaching using a rhythm-based curriculum?**
2. **What do you mean by developing digital skills aligned to rhythm-based learning with the use of technology?**
3. **How would you perceive a professional development-training program in terms of associating teaching with rhythm-based activities and technology?**

Follow-up questions may include:

1.1 What do you see as the value of rhythm-based teaching especially by using dance and music as a pedagogical strategy for enhancing student's learning?
1.2 How would you design and deliver the rhythm-based curriculum in terms of technology uptake, outcomes, assessment and feedback?
1.3 How would you deliver the rhythm-based curriculum in terms of teaching modes (face-to-face, blended, distant), technology used (VLEs, MOOCs) and teaching spaces (formal, informal)?
2.1 What do you mean by digital skills for rhythm-based teaching and learning?
2.2 Why such digital skills are important for you to teach the rhythm-based curriculum?
2.3 How would you assess / evaluate the level of the digital skills acquired by the teachers that will enable them to teach the rhythm-based curriculum with the use of technology?
3.1 What will be the nature of the training courses mostly relevant to you? Can you please give an example of a training course associated with rhythm, using dance and music as rhythm-based instruments?
3.2 What would be the learning design elements of such a course (e.g. focus on activities, learning outcomes, background knowledge, skills gained).

Once we have presented the two overarching questions as points of departure to explore the problem space, we will use participatory and user-centred design practices to unveil the collective consciousness of the participating teachers. In particular, during the meetings C1 in Crete and E1 in UK we will carry out training activities for teachers to design, build and make in playful ways what do they mean by instigating music and dance and a rhythm-related teaching strategy to their own teaching and learning. Teachers were engaged in activities that encourage them to discover, define, empathise and ideate for understanding some of the challenges they are experiencing while teaching.

3.2.1 Ideating, empathising, discovering and defining with the use of playful artefacts

During C1 and E1 we will introduce three sets of different game cards for aiding the process of creating new ideas on how rhythm and digital skills may help teachers to enhance their teaching and ultimately practicing rhythm-based teaching in their classrooms. At Coventry University we have developed a set of game-like card decks as means to help user groups to ideate, externalise their ideas and engage into a process of discussion, debate and argumentation. This process may extract rich data on how people experience, conceptualise and understand certain phenomena in question hence it provides a framework for linking and contemplating on the relationships between different ideas. The first card deck is about helping end-users to create a story or a narrative with playful prompts from three key elements: Activity, Context and People (see figure 2). There is no structured set of rules, participants will be guided on reflecting to the overarching questions to set the theme of the game and then all players will draw one card from each element deck. They may use pen and paper or other tangible toys to sketch their creations in conjunction to using the card-decks for articulating in depth on their story.

Fig. 2: Employing narrative / story-telling game cards as an artefact for unlashing ideas, processes and practices of teaching using rhythm and for eliciting needs on digital skills development for teaching rhythm-based learning with the use of technology.

To amplify the process of creation, ideation and discovery, we will employ another set of cards focused on playful learning design as an aspect that will enable teachers to pinpoint the learning design elements meaningful to them to help us design the rhythm-based curriculum. It is essential therefore to identify the learning and teaching elements that will comprise the curriculum. It is also key for the curriculum design elicitation requirements to be as dynamic as possible to enable teachers to align subject content and be orchestrated by using the activities, assessment, feedback and outcomes identified, represented and planned as part of the rhythm-based curriculum. The rules of the learning-design card game are open and flexible and they can be played either individually or in groups. Our aim is to engage participants in groups to think and map the elements of the curriculum collectively and to come-up with rhythm-based activities aligned with related digital skills necessary for designing and delivering the curriculum in class.

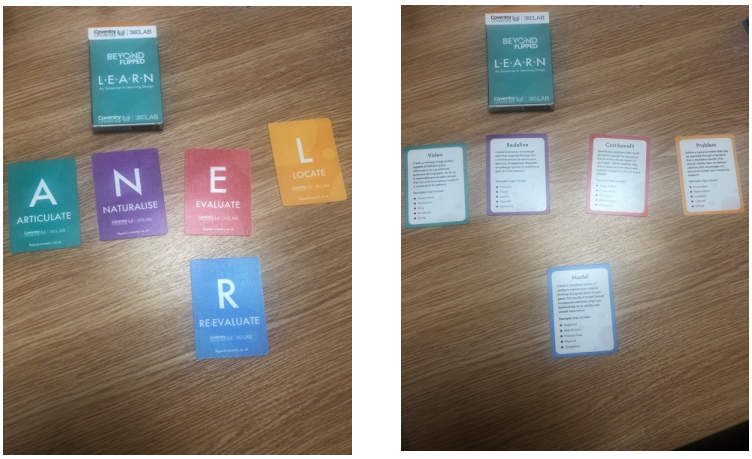


Fig. 3: Employing the learning-design game cards as artefacts to help participants to ideate on the necessary rhythm-based learning elements and what are the associated digital skills and competencies envisioned for teaching the curriculum with the use of technology

The story-telling and the learning design cards were used both for ideating and representing ideas on designing and delivering the rhythm-based curriculum and for understanding the needs on digital skills competencies development and how such skills may be assessed in conjunction to teaching rhythm-based learning.

As part of the Design Thinking workshop held during the C1 event in Crete on Wednesday 3 April 2019, participants such as dancers, educators and teachers from Sweden, Greece, Cyprus and UK were tasked to visually represent what they think rhythm-based teaching is. Participants presented their designs for about 15 minutes each and then drafted a summary of their ideations and forwarded to the team accessed via Appendices.

COVUNI started by presenting a presentation elaborating on the needs requirements stage that the project is currently exploring and the ideation activity which would help us to elicit ideas, experiences and beliefs on how the various stakeholders experience rhythm-based teaching, digital skill competencies for teaching rhythm with the use of technology and how an online training programme would be designed and delivered. To facilitate the ideation process, COVUNI brought a set of game cards, as described above, that the participants used as scaffolds for coming up with ideas and concepts related to the aspect presented by a specific card. This had an immediate effect for participants to focus on specific concepts and their relations, such as for example who are the main stakeholders or what are the potential challenges faced when designing and delivering a rhythm-based curriculum. Before starting the process of ideation, participants were divided into groups, based on their country as for their representations to be more context specific and related to the reality of the educational system concomitant to the challenges and implications raised for enacting a rhythm-based curriculum to the different countries.

The cards were used in parallel with the tangible toys we had to promoting a feeling of making and creation, and for participants to have something tangible to show. The teams started to work on their ideas and representations and comments and discussions were captured along the way. For example the UK team (see Fig.4) started to look for evidence in the literature to find studies from

previous research on rhythm, dance and music and the pedagogies, strategies and learning outcomes pertaining the fusion of conventional teaching with rhythm-based activities. The UK team suggested a framework for identifying impact, external influences that would potentially discourage teachers to adopt a rhythm-based intervention such as for example teachers' workload, the national curriculum and financial constraints. The entire proposition may be accessed in Appendix 1.


Fig. 4. The UK team presents a framework for incorporating rhythm-based teaching into the curriculum.

Participants from UoC (see Fig. 5) attempted to identify learning artefacts such as tools, assessment methods, feedback elements and modes of teaching. A participant from UoC reflected on the challenge of being inclusive with rhythm-based learning and noted that by having rhythm as an intervention does not necessarily mean that students with special needs will learn better, or even most importantly all students will learn better than they do already. This was a critical point to the discussion for juxtaposing the effects of rhythm-based learning will not provide any substantial difference in the way that teaching and learning is approached, but rather it may be perceived as an alternative strategy for students to twin subject content with some artistic activities.


Fig. 5. UoC's approach to introducing rhythm-based teaching into the classroom in an inclusive .

The Swedish partners highlighted the importance of dance to students in terms of helping to form an identity, becoming a member of a community and overcoming hurdles such as isolation, stress and anxiety to cope with learning the subject matter as described by a dancer that felt sensory and motor based-skills and learning disorders especially in hard sciences (e.g. mathematics) may be improved when rhythm and dancing are enacted in par with learning models and strategies in schools. It was also noted that teachers that are involved in teaching disabled students need to have the competencies, skills and experience as means to be able to support the development of disabled students in an informed, conscious and systematic way (see Appendix 2).

Fig. 6. The Swedish team contemplating on the importance of introducing rhythm-based learning in schools and how practices involving rhythm such as dance are life-changing for students with disabilities.

The Cyprus team (Fig. 7) described the process from a story-telling perspective of designing rhythm-based activities in way that will be appealing to the student to mitigate the feeling of entering a formal learning space such as the classroom. The common perception was that rhythm complements and enriches and does not substitute existing teaching. Students need time and guidance to understand how rhythm may help them to advance learning and teachers need to facilitate this student-centred process (see Appendix 3).

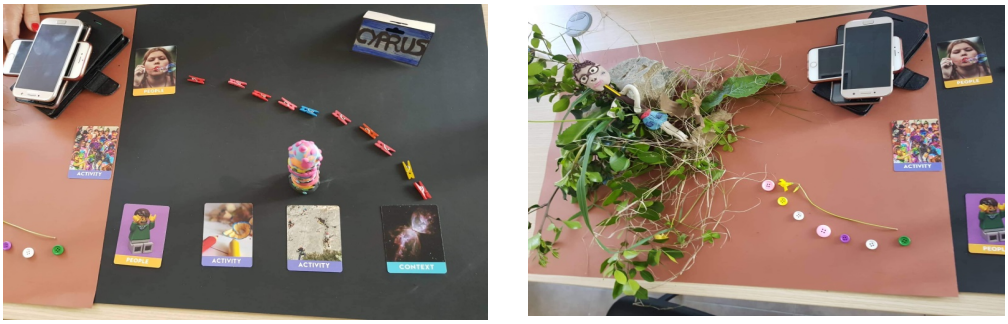


Fig. 7. The Cyprus team reflecting on a fictional narrative representation that views learning as a challenging and developmental process where the end product is different for each student whilst embedding rhythm to facilitate each student's learning path.

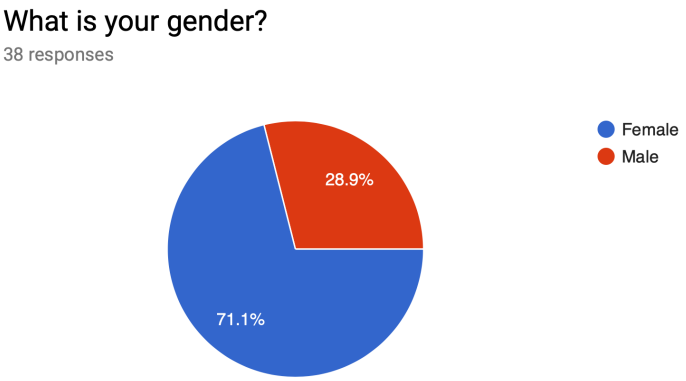
3.2.2 Data collection and analysis for user-centred analysis on user-requirements

We have created an online questionnaire[1] for eliciting user requirements on three distinct aspects: (1) on rhythm-based teaching and learning as means to obtain better understanding on how teachers view rhythm-based teaching; (2) on digital skills competencies to extract the basic criteria under which the competency assessment framework will be based upon and (3) on the rhythm-based curriculum for eliciting the context and structure that will constitute the design backbone of the curriculum. A blend of different types of questions such as closed and semi-structured have been formulated, with a tendency to consciously include more semi-structured questions to elicit both factual and conceptual data. In particular, for section 1: requirements on rhythm-based teaching we have developed 14 questions in total out of which 5 were closed questions and 9 were semi-structured. In section 2: digital competencies we formulated 11 questions from which 2 were closed and 9 were semi-structured. In section3: rhythm-based curriculum we have developed 13 questions from which 1 was closed and 12 were semi-structured. We received 38 responses (n=38) from Greece (16), UK (13), (6) Cyprus and 3 (Sweden) representing a rich and reliable dataset from schoolteachers with different cultures, teaching approaches and diverse backgrounds to help collect varied data from different perspectives.

Each questionnaire section has been analysed separately by the different partners. We have distributed each analysis task as per the Description of Work. Specifically, section 1 rhythm-based teaching has been analysed by LCEducational, section 2: digital competencies has been analysed by COVUNI and section 3: Rhythm-based curriculum has been analysed by UoC. UoC and LCeducational followed a more factual approach to analysing the data whilst COVUNI followed a thematic approach to identify the categories and sub-categories stemming out to form the metrics for the digital competency framework.

3.2.3 Survey Demographics

Gender was not entirely distributed meaning that 71.1% were females and 28.9% were males showing that more females responded to the questionnaire than males.



[1] https://bit.ly/2k5hgbi

Fig. 8. Gender

Primary education was the main field of interested teachers and also secondary education as a secondary target as depicted below.

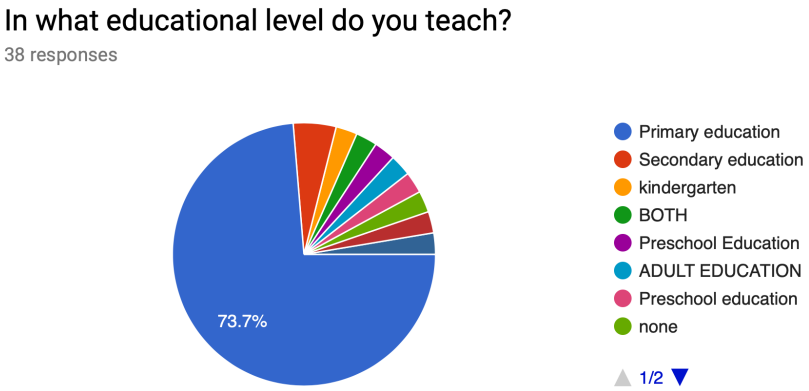


Fig. 9. Educational level

3.2.4 Review on and analysis of teachers' needs of teaching using rhythm-based learning.

A number of studies contemplate on the importance of teaching via rhythm. Rhythm based activities are enhancing memory, attention and interest of students. For example, rhythm through music that is soothing and relaxing may help students get over stress or anxiety while studying or when they are having a class. Background music may improve focus on a task by providing motivation and improving mood. During long study sessions music can boost endurance and patience because of the ''good vibe'' is creates in a room.

According to Millington rhythm embedded in various instruments such as in songs is considered as a valuable pedagogical intervention because children remember a song easier than an ordinary book. To start with, they help in listening because listening to a dialog becomes monotonous at a point whereas songs don't because of the melody and rhythm. Secondly, rhythmic patterns in songs support vocabulary as words are repeated in each song so this repetition helps to improve vocabulary. Thirdly, rhythm helps children to form sentences and sentence patterns. In addition, students learn about their culture through song activities and increase their enjoyment in class. On the other hand, there are some limitations according to Millington; the teacher has to be careful with what songs she is choosing, as the vocabulary, language and sentence structure in songs is sometimes different than in curriculum. (Millington, 2011)

Furthermore, rhythm and music help the body and the mind work together. Exposing children to music during early development helps them learn the sounds and meanings of words. Rhythm via music helps children build motor skills while allowing them to practice self-expression. For children and adults, music helps strengthen memory skills. According to Gromko a research on kindergarten students revealed that kindergarten children who attended 4 months of music instruction had

significantly better results in development than the ones who didn't. (Gromko, J. E. 2005). In addition, according to Register et al. they did an experiment on second grade students who have specific learning disabilities in reading. An intensive short-term rhythm-based curriculum was designed to develop reading comprehension and vocabulary skills at the second-grade level. The results revealed that students with specific disability in reading improved based on the results they had from the tests before and after the designed music curriculum (Register, D. et al. 2007).

Rhythm-based instruction may improve children's memory, cognitive development, learning skills and expressive ability. Additionally, it promotes group learning, practicing social skills such as turn-taking and cooperation. Rhythm is mostly used as a pedagogical strategy in arts, humanities and social sciences, but according to Chahine rhythm-based teaching is central in mathematics, geometry and algebra. Such applications are particularly beneficial for: (1) Develop students' competencies to work successfully with mathematical modelling of musical rhythms; (2) Motivate students to study mathematics by showing them the real-world applicability of mathematical ideas; (3) Provide students with opportunities to integrate mathematics with music; and (4) Increase the scope of mathematical content and the range of problem situations that involve computing, constructing, modelling and visually representing musical rhythms. At the end of the study teachers expressed a real interest on teaching mathematics through music and rhythm as one teacher noted: ''I was impressed to witness a common childhood beat receive a symbolic mathematical representation.'' (Chahine, I., 2015).

Survey analysis on teaching using rhythm-based learning

Could you please explain what do you mean by rhythm-based teaching?

- *Using music and rhythm in everyday teaching in order to enhance learning.* (13 Participants)
- *Using rhythm to implement movements, physical activity and dancing in teaching.* (9 Participants)
- *Using rhythm in order to make the teaching process more interesting, enjoyable and effective for students.* (8 Participants)
- *Don't know.* (4 Participants)
- *Using rhythm in order to'' motivate students experiment, improvise and familiarize themselves with the sounds around them''* (2 Participants)
- *Using rhythm to improve teaching for students with learning and behavioral disabilities.* (2 Participants)

In what way you feel you would embed rhythm in your teaching?

QUESTION 2 /ANSWERS	N(%)
Dance	4 (10.5%)
Music	6 (15.8%)
Acting	0
Physical exercise	3 (7.9%)

All of the above	22 (57.9%)
Mostly dance and music	1 (2.6%)
All of the above, plus the cultivation of a ''hearing behavior'' meaning that we learn to hear everything in the environment	1 (2.6%)
all of these are activities that contribute to the cultivation of a "hearing behavior," which means a life attitude that makes us listen to everything. Dance, music, movement are natural ways of expressing through which children interact and express feelings. They give children the opportunity to experiment with the movement of their bodies, to explore different rhythms and ways of movement, discovering their potential	1 (2.6%)

Table 1: Rhythm in teaching

How would you design and deliver activities related to rhythm encompassing music and dance? Could you please give an example?

- *Combine music and dance with curricular subjects.* (12 Participants)
- *Through games related with dance and music.* (11 Participants)
- *Music and dancing activities that will help students to relax, express their ideas, feelings, be creative and inspired.* (9 Participants)
- *Help noisy and/or naughty students behave appropriately.* (2 Participants)
-*Enhance teamwork* (2 Participants)
- No answer (2 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Combine music and dance with curricular subjects	*I would find for example a poem/song about our topic and introduce it to kids by listening and then playing/singing/acting it.* Female pre-school teacher, Greece

	We will dance curricular subjects, Female primary school teacher, Sweden
Through games related with dance and music	*Creating games with dance and music.* Female pre-school teacher, Greece
Music and dancing activities that will help students to relax, express their ideas, feelings, be creative and inspired	*Firsrly, it is important to mension that very activity needs to be adapted on the individual characteristics of each person/student. I will choose an instrumental song and an large class where kids can express themselves and their feelings.* Female primary school teacher, Greece
Help noisy and/or naughty students behave appropriately	*To wait for his turn* Female pre- school teacher, Greece *To calm a noisy class* Female primary school teacher, Greece
Enhance teamwork	*Start from a rhythmic improvisation with the group working together to find common rhythm base. Working with your own body and your own momentum. You have to listen to everyone in the group (working together) so you have to engage many senses. For example, you can use this to exchange rhythms from different cultures. Students can share music and dance rhythms that are familiar from their family cultures, but their can also work within this framework to find commonalities.* Male primary school teacher

Table 2: Rhythm-based activities

Why do you feel that combining teaching with rhythm may improve student's engagement and learning?

- *Teaching becomes more interesting so students learn and remember easier and better.* (7 participants)

- *Experiential learning helps students to remain focused and attracted during the lesson.* (10 participants)
- *The class will be fun and enjoyable.* (11 participants)
- *It helps less confident students to participate and express themselves.* (6 Participants)
- *Promote team work* (2 Participants)
- *No answer* (2 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Teaching becomes more interesting so students learn and remember easier and better	*It is a multi-sensory approach that should enhance learning.* Female Primary school teacher, UK
Experiential learning helps students to remain focused and attracted during the lesson	*Because rhythm can help children to be more focused.* Female Primary school teacher, Greece
The class will be fun and enjoyable	*It is more fun.* Male Primary school teacher, UK *It will ensure a positive classroom environment.* Female Primary school teacher, Greece
It helps less confident students to participate and express themselves.	*Breaks down and unlocks insecurity of student and releases inner freedom and expression* Female High school teacher, Cyprus
Promote team work	*Yes because they work as a team.* Female Primary school teacher, Greece

Table 3: Rhythm for improving engagement and learning

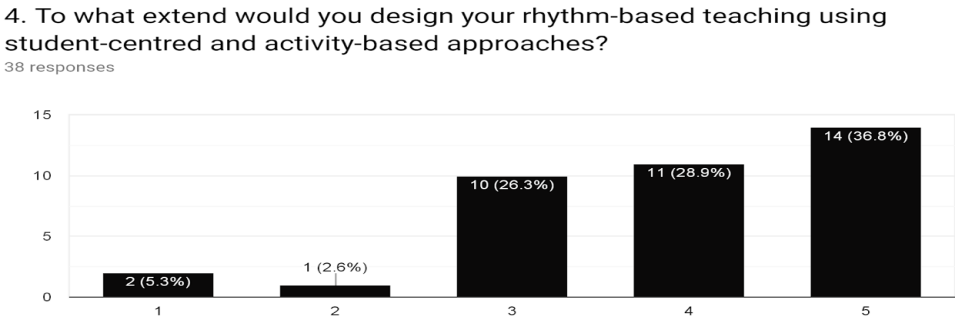


Fig. 10. Designing rhythm-based teaching

To what extend would you design your rhythm-based teaching using student-centered and activity-based approaches?

QUESTION 2 /ANSWERS	N(%)
With standalone tools for content delivery (e.g. whiteboards, mobiles, PCs)	10 (26.3%)
In blended forms by designing online learning activities through an institutional learning management system	2 (5.3%)
In blended forms by engaging students in discussions / debates via using social media	2 (5.3%)
By Flipped learning assigning students to prepare for the next day by watching an online video and engage into in-class activities?	4 (10.5%)
I don't use technologies for learning and teaching	7 (18.4%)
By designing mobile learning activities (e.g. mobile games?)	1 (1.6%)
All of the above	12 (31.6%)

Table 4: Student-centred and activity-based approaches

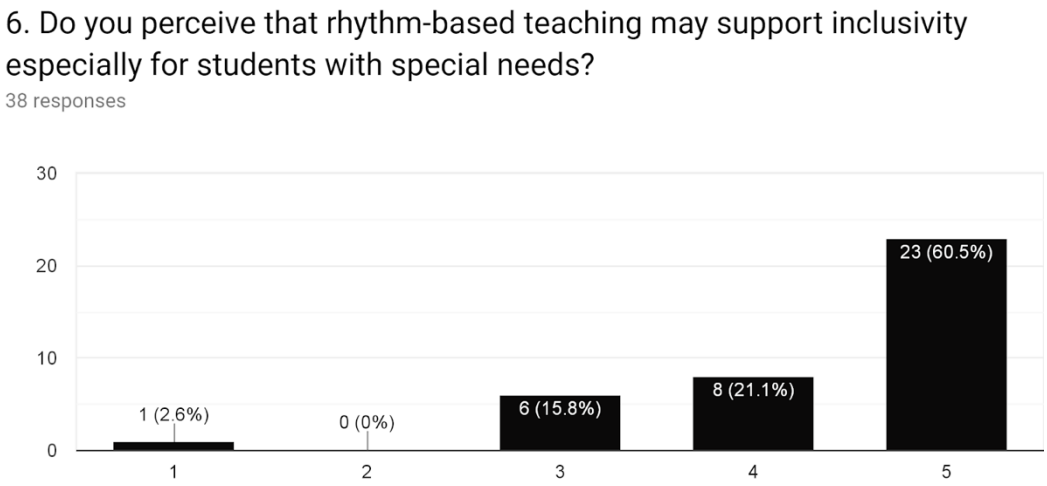


Fig 11. Inclusive rhythm-based teaching

How do you think that rhythm-based teaching may support inclusivity especially for students with special needs? Could you please give an example?

- *Students with special needs will feel part of the class with no discriminations.* (18 participants)
- *Children with special needs have a good reaction to sounds and music so they can participate.* (11 participants)
- *Teaching is easier and more comprehensible.* (7 participants)
- *No answer* (2 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Students with special needs will feel part of the class with no discriminations.	*Because teaching is simpler and more comprehensible and enjoyable.* Female primary education, Greece
Children with special needs have a good reaction to sounds and music so they can participate.	*THE DIVESITY GAP IS LESS.* Female Adult education, Cyprus
Teaching is easier and more comprehensible	*It is an area that the majority of students can participate, so they can reach happiness and success.* Female, primary education, Cyprus

Table 5: Supporting inclusivity

How do you feel that music and dance as rhythm-based instruments may support students with special needs in their learning journeys? Could you please give an example?

-*They will be more concentrated and motivated.* (8 Participants)

- *They will communicate and socialize with other students.* (10 Participants)

- *Express themselves.* (13 Participants)

- *They have more tools so better and easier learning process.* (3 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
They will be more concentrated and motivated.	*Strengthens attention, strengthens self-esteem, gives motivation, joy and enjoyment* Female pre-school education, Greece
They will communicate and socialize with other students.	*Can improve communication and socialization* Female primary education, UK
Express themselves.	*Music is another form of expression. It might elicit an emotional response* Female primary education, UK *Students with special needs frequently need opportunities for self-expression and the chance to work practically on deep social skills. A child who, for example, tends to shout out in class, whose attention wanders after a short time and who struggles to understand verbal information and instructions will be assisted in their learning by rhythm based teaching because: They feel less need to shout out as they are already expressing themselves. Their attention is improved because they are actively participating in the learning, not passive listeners or watchers. Their understanding is improved by being able to watch and copy their peers within the repetitive nature of the rhythm. And most importantly they have an opportunity to*

	develop deep level skills in a practical activity where feedback on their behaviour and it's effect on the rest of the group is clear immediate and team centred (rather than coming primarily from the teacher). Male, primary education , UK
They have more tools so better and easier learning process.	*As an additional support to help them getting engaged in learing process; by rendering teaching material more attractive* Male primary education, Greece *It gives them more tools* Female, primary education, Sweden

Table 6: Supporting students with special needs

How do you think that conventional teaching activities may be accompanied by music and dance activities? Could you please give an example? (If different from the question 8)

-*Use it as a method to recall and recollect knowledge.* (5 Participants)

-*Combine dance and music for more easy and interesting learning process for several classes (for example, history, geography, grammar, mathematics etc.) or activities (for example, poetry, choreographies).* (17 Participants)

-*Same with question 8* (13 Participants)

- *I don't know* (1 Participant)

-*No answer* (2 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Use it as a method to recall and recollect knowledge	*I could include music and dance in my conventional teaching as a method to recollect the knowledge.* Female, Primary education, Greece
Combine dance and music for more easy and interesting learning process for several classes (for example, history, geography, grammar, mathematics etc.) or activities (for example, poetry, choreographies)	*Poetry, Dance (we are currently learning about castles and have been learning medieval folk dances), Language, vocabulary and phonics.* Female, Primary education, UK *In maths, numbers may be represented by*

	rhythm instances so each student may perform a rhythm which will resemble a number. Female, Primary education, UK

Table 7: Music and dance activities

What are you trying to achieve by using rhythm-based teaching through music and dance?

-*Inclusive education and team work* (10 Participants)

-*Joyful and motivated students that will have good memories* (16 Participants)

-*Better learning experience and more knowledge* (5 Participants)

-*Increase concentration and attendance in class* (6 Participants)

-*No answer* (1 Participant)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Inclusive education and team work	*A harmonious learning classroom! Inclusivity amongst pupils. Confidence in the classroom for students who struggle with reading and writing.* Male, Primary education, Sweden.
Joyful and motivated students that will have good memories	*To make students feel happy and that learning is a fun creative process.* Female, primary education, UK
Better learning experience and more knowledge	*Increased understanding of content* Female, primary education, UK
Increase concentration and attendance in class	*To make all classroom students collaborate and being more committed to classroom learning processes; activate curiosity and willingness to participate.* Male, primary education, Greece

Table 8: Objectives of music and dance activities

What are the challenges you would experience in teaching using rhythm-based activities?

- *It is not part of the national curriculum and traditional way of teaching.* (6 Participants)

- *Teachers don't feel confidence that they can do it* (8 Participants)

- *Lack of time and resources* (8 Participants)

- *Possible denial from students* (13 Participants)

- *I don't know* (1 Participant)

-*No answer* (2 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
It is not part of the national curriculum and traditional way of teaching	*Does not fit with traditional teaching and learning.* Male, primary education, UK
Teachers don't feel confidence that they can do it	*I don't feel quite sure confident about my abilities.* Female, primary education, Greece
Lack of time and resources	*Lack of materials recourses.* Female, primary education, UK *Time and space limitations.* Male, primary education, Greece
Possible denial from students	*Student's acceptance of the approach.* Female, primary education, UK

Table 9: Challenges

What do you mean by increasing your knowledge and skills in delivering rhythm-based teaching using music and dance?

-*Learn more for example by seminars* (7 Participants)

-*Exercise and improve* (12 Participants)

-*Be ready and prepared on the material they have to teach and know how to teach in a new way* (17 Participants)

-*I don't understand the question* (1 Participant)

-*No answer* (2 Participants)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Learn more for example by seminars	*Training, examples of where this has been successfully implemented.* Female, primary education, UK
Exercise and improve	*To practice it myself and learn new methods that I would not think of myself.* Male, primary education, Sweden
Be ready and prepared on the material they have to teach and know how to teach in a new way	*I mean to further develop my teaching so that I can use rhythm based teaching as a day to day part of my lessons, when and wherever beneficial or appropriate.* Male, primary education, Sweden

Table 10: Increasing knowledge and skills

What aspects of your rhythm-based teaching may be further developed (e.g. relevant music and dance activities, outcomes, subject content, assessment use of technology etc.)

- *Dance and music activities* (11 Participants)
- *Subject content* (9 Participants)
- *Use of technology* (7 Participants)
- *All of the above* (4 Participants)
- *Don't know* (4 Participants)
- *Combination of the examples given* (2 Participants)
- *No answer* (1 Participant)

Why these particular aspects of rhythm-based teaching are perceived as necessary for your development?

- *To improve and develop the teaching process* (10 Participants)
- *Don't know* (9 Participants)
- *Learning becomes interesting for students and teachers* (8 Participants)
- *Rhythm is important part of everyday life* (6 Participants)
- *No answer* (4 Participants)
- *They aren't* (1 Participant)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
To improve and develop the teaching process	*It will help me to develop the way I teach and how I perceive dance and music as learning sources combined in my teaching*

Learning becomes interesting for students and teachers	*Because I like this, and the children also like*
Rhythm is important part of everyday life	*Music is all around us, we communicate with rhythm even if we are not aware of it,*

Table 11: Development aspects

3.2.5 Review on and analysis of teachers' existing and new digital competencies

As school environments experience digital demands, the capacity and capability for digitally competent teachers requires an increasingly detailed account especially when the curriculum combines rhythm-based practices with music and dance as the main instruments for teaching with rhythm. In particular, the need for adopting approaches to teaching that combine the use of a plethora of digital technologies to deliver rhythm-based activities is a sine-qua-non-intervention for helping students to develop their own digital competencies for learning rhythm in online or blended learning environments.

This section provides a brief review on previous research contemplating on the skills, capabilities and competencies suitable for educational purposes in general and for digital teaching profession skills in particular (e.g. Instefjord & Munthe, 2017). The overarching question that this section aims to address is: "What digital competencies and capabilities are increasingly relevant for enabling school teachers to design and deliver rhythm-based activities with the use of technology?

The overarching assumption to investigating digital competencies for designing and delivering rhythm-based activities is that the way teachers develop digital skills and competencies may influence student's online or blended approaches to learning. The integration of technology in education has been a wide area of research and discourse in schools, but there are a number of arguments, which support the lack of effort to efficiently intergrade technology with curriculum delivery (e.g. Instefjord & Munthe, 2017;Svensson and Baelo 2015; Kay, 2006; Tondeur et al., 2018).

Digital competency development may be understood as an inter-connected set of skills or competencies for enabling the design and orchestration of teaching and learning through the use of digital technology (List, 2019). In this document, we will use the term digital competency development to align with the European terminology and to uphold consensus with the Digital Competencies Education Framework (DigiCompEdu). Different terms have been rendered to denote the development of digital learning skills such as: digital literacy (e.g. List, 2019), ICT literacy and ICT competence (e.g. Tondeur et al., 2018) and digital capabilities (Jisc, 2017). There is differentiation in meaning when these terms are used from more technical-centred instantiations (e.g. ICT literacy) to more knowledge-centred and integrated (e.g. ICT competence) focusing on the information, knowledge and pedagogical strategies, tools and processes employed to foster learning with the aid of technology (e.g. Margaryan et al., 2011). Commentators argue that the purpose of acquiring digital competencies is also distinguished in two types of competencies: (a) for helping students to use ICT in the classroom and (b) for designing a rich mediated ICT-enabled learning environment (Tondeur et al., 2016). *As a third type of competencies complementing the two, we propose competencies that promote inclusive, creative, meaningful and personalised teaching and learning for ideating, designing, orchestrating, assessing and reflecting on teaching and learning with the use of digital technologies.* The third type of ICT competence is in line with the Digital Competence of Educators

(DigCompEdu) framework and it also alludes to the premise that digital competency development should only focus on how to use technology but also on how pedagogy, presuppositions, beliefs and context shape the way teaching and learning is designed, delivered and assessed. This echoes European Commission's view of competence as the twinning of knowledge, skills and attitudes to successfully develop and practice for instigating life-long learning (European Commission, 2006). In turn, this informs European Commission's view of digital competencies as the confident and critical use of Information Society Technology (IST) for acquiring basic skills in ICT as means to retrieve, access, store, produce, present and exchange information and to communicate and participate in online collaborative networks. Decomposing this view, we can distil certain digital competencies as central in teachers' digital competency development. As such, the DigCompEdu identifies 22 competencies categorised in six thematic areas focusing on different aspects of teachers' professional activities. We will contemplate in detail the areas and competencies of the DigiCompEdu and how it informs our Digital Competencies Assessment Framework for Rhythm-based Teaching in O2.

A number of studies have attempted to conceive and define digital competencies from different cultural, contextual and socio-technical backgrounds. For example, Svensson & Baelo (2015) presented the design of a survey instrument to collect data on how teachers perceive their digital competencies. Instefjord & Munthe, (2017) investigated the development of pre-service teachers' digital competencies in Norway and amongst the findings, was that the use of ICT in learning and teaching was not part of the intended learning outcomes in subsequent teacher education programmes making an explicit inference that digital competencies may not be as much emphasised as other areas of professional development. Gunes & Bahcivan (2018) conducted a study with 979 science teachers on digital literacy and found that teachers' self-beliefs on and prior experiences of digital literacy skills influence the level of expertise and dexterity on specific digital competencies, and that their overall epistemology for teaching and learning was affected from their digital literacy views. A central digital competency is associated to the creation and use of digital learning resources. Ramirez-Montoya & Mena (2017) study aimed to understand teachers' self-perceptions of digital competencies affect in a deeper understanding of how to create and use Open Educational Resources (OERs). Similarly, to Gunes and Bachivan study, self-beliefs on previous knowledge, skills and capabilities with technologies influence their level of competency in creating, using and sharing OERs. The study also highlighted the correlation between high-skill competency levels with the ability to create and use digital resources. Garcia-Martin & Garcia-Sanchez (2017) carried out a study with 483 pre- service teachers' competencies dimensions of digital literacy and showed a tendency for teachers to use social networks and their desire to further develop their digital competencies by focusing on increasing or updating their knowledge on learning theories, concepts and paradigms as well as increasing their communication skills. Taimalu and Luik (2019) conducted a study about the impact of teachers' beliefs on technology adoption for teaching and learning and confirmed results from previous studies that found teachers with more behaviourist conceptions of teaching held more naïve conceptions of technology integration whilst teachers with more constructivist beliefs of teaching were more likely to have more cohesive conceptions of technology integration.

Strategies reported in previous studies for developing teachers' digital competencies include digital skills development, instructional development and field experience courses (e.g. Mouza et al., 2014). However there seems to be a disjunction between theory and practice when teachers are participating in such digital skills development courses. Although teachers may learn the theoretical foundations of different technological tools and increase their self-efficacy, there is no evidence that they implement the acquired knowledge into the classroom (Kay, 2006). To alleviate this discrepancy

between theory and praxis, commentators have suggested to change the curriculum content, whilst retaining the structure of the courses, by placing more emphasis on pedagogical, design-like, technological and content problems under the principle of learning-by-design (e.g. Koehler et al., 2005) and thereby focusing on creative and hands-on processes and strategies in developing digital skills. A plethora of strategies that could be employed in digital skill development programmes include having trainers acting as role models (e.g. Lee & Lee 2014), collaboration and group-work (Tearle and Golder, 2008), authentic educational technology (Valtonen et al., 2015) and meaningful feedback (Ryan et al., 2019). There is no empirical evidence however on the relationship between digital skill-competencies with more artistic and rhythm-based curriculums as a contextual influence to developing digital competencies. This Rhythm project aims to investigate this relationship in subsequent outputs such as in O2: Digital competencies assessment framework, O3: Development of the Rhythm-based Curriculum and O4: Online training programme.

Survey analysis of teachers' digital competencies

In this sub-section we present the survey's analysis comprising of themes and subthemes of teachers views of the reported digital competencies that would likely be consistent, relevant and informative of the rhythm-based activities with the use of technology. Table 12 provides the themes and numerical evidence of the theme's occurrence in participant's responses. Table 13 presents representative quotations along with the themes and sub-themes for associating the constituted meanings with participants' responses.

From factual data, respondents seem to feel that rhythm-based teaching and learning with the use of technology may improve learning and engagement with 92.1% responding 'yes' and only 7.9% saying 'no' (see Fig. 10)

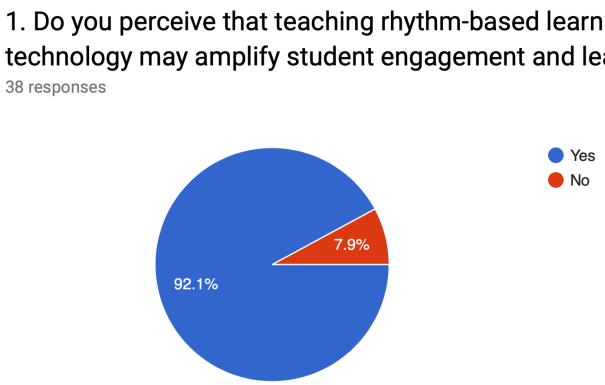


Fig. 12. Perceptions on teaching rhythm-based learning with the use of technology as means to increase learning and engagement

Respondents also perceived that certain digital skills need to be developed hence support and guidance to identify and build those digital skills is an important process. 89.5% perceived them as important and 10.5% thought of them as not important.

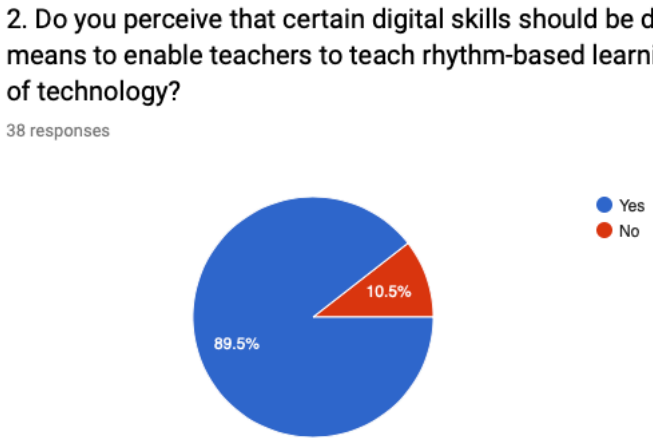


Fig. 13. Perceptions of the importance of developing digital skills for rhythm-based teaching

Themes and sub-themes	Number of references in survey
A: Designing, developing and delivering rhythm-based digital content	**30**
1. Designing digital content	5
2. Developing digital content	10
3. Representing digital content	15
B: Acquiring data, information and media literacy skills	**27**
1. Understanding and tracking student's progress through gathering and analysing data	6
2. Finding, accessing, using and sharing information	11
3. Producing and editing digital media	10
C: Developing skills in employing digitally and activity-led pedagogies	**27**
1. Collaborative learning	10
2. Inquiry and problem-based learning	5
3. Activity and digitally-led assessment	5
4. Providing multiple modes of feedback	3
5. Reflection	4
D: Becoming ICT proficient in digital learning environments, devices, applications, software and services	**25**
1. Technical use of software and hardware for tracking, recording and representing progress and performance	5

2. Applying knowledge to solve technical problems with software and hardware	7
3. Selecting software, hardware and services based on learning and technical requirements	13
4. Basic understanding of computing, coding and systems thinking	1
E: Assessing existing and new digital skills	**25**
1. A structure that represents a spectrum of different digital skills associated with rhythm-based teaching	11
2. Associated metrics representing variation of the digital competence assessed	6
3. Qualitative understanding of how individual competencies may be practiced across different progression levels	5
4. Comparing and sharing individual competencies with competencies acquired from fellow-teachers and other stakeholders	1
5. A record representing acquired competencies and an audit trail of new competencies need to be developed	2
F: Developing digital creativity skills, empathy and a do-it-yourself culture	**20**
1. Ideating, brainstorming and designing rhythm-based activities	12
2. Personalising, sharing and re-mixing rhythm-based activities	3
3. Empathising with students needs and interests for a custom activity design	3
4. Producing tangible digital learning resources	2
G. Digital professional development	**11**
1. Developing authentic rhythm-based experiences using sound, music and choreography	8
2. Meaningful feedback on theory and practice	2
3. Developing an online knowledge building forum	1
H. Fostering student digital inclusion, social influence and relatedness	**10**
1. Embedding equal digital learning opportunities into the digital learning environment	7
2. Acting as role models offering best practice examples in implementing technology	2
3. Designing digital learning resources that are related to students' past experiences, feeling and emotions for increasing engagement and motivation	1

Table 12: Themes describing aspects of digital skills development for teaching rhythm with technology

Theme A: Designing, developing and representing rhythm-based digital content

In this theme, digital skills development was focused on content creation and use for rhythm-based related content. Design of digital content was felt as important for structuring and determining what

and how content will be available to students. Designing content was distinctive from developing content in a sense that the teacher first has to learn what content needs to be provided, how it will be visualised and represented, how it will be associated with the learning outcomes, activities, feedback and how it will be sequenced with content, activities and outcomes from different subject topics. Designing content was connected with personalising the learning experience to students and therefore, designing content to suit student's needs and interests was part of the content design process. Active engagement and differentiation were also mentioned as processes that may be achieved and supported by learning how to design rhythm-based content. Creativity and planning ahead was felt that could be strengthened by learning how to design rhythm-based content. Developing digital content felt like being a natural continuation of the design phase. Once the design parameters are established, then teachers were putting into practice their design plans to produce digital content considering the tools, the students' level and the mode of teaching. Once the developing phase completed then the representation content stage started as means to deliver, visualise and provide content to students. Protecting sensitive learning content and student's personal information and the processes that need to be followed for ensuring that content is safely created and distributed to students was a high concern.

Theme B: Acquiring data, information and media literacy skills

Having the skills, competencies and capabilities to access, find and retrieve data, information and media was a central aspect of digital skills development. Teachers felt that they had to develop their skills on how to find and use information. Learning about current trends in rhythm-based teaching through finding online information was also key for keeping abreast with ongoing developments in rhythm-based teaching. Sharing information about rhythm-based teaching with students and other teachers was also perceived as part of being information literate. The use of different media for designing rhythm-based learning and also developing and editing sound and music related media. The essence was to get an understanding of digital media as rhythm-enabled artefacts for learning and teaching and of digital media production as a technical dexterity. Data literacy was perceived as the ability to track, record and analyse student's performance as means to help students to improve their performance as well as making the necessary adjustments to lesson planning, content, assessment and feedback for tailoring the lesson and topic to students needs.

Theme C: Developing skills in employing digitally and activity-led pedagogies

Key in this theme is having the skills to employ digital pedagogies that would afford the use of technology for rhythm-based teaching. Reported pedagogies that may allow for more activity-based learning with the use of technologies included collaborative-learning, problem-based and inquiry-based learning as means to instigate creativity, research and online communities of practice. Activity-led pedagogies were seen as key for enriching teaching strategies but especially it should be a closer relationship with rhythm-based teaching in terms of deploying a particular paradigm aligned with personal conceptions of teaching and beliefs about how activity-led teaching may enhance learning with the use of technologies. Developing meaningful assessment and feedback following the principles of activity-led practices and helping students to reflect on feedback received for understanding and applying it for improving performance was key.

Theme D: Becoming ICT proficient in digital learning environments, devices, applications, software and services

Central to this category is developing the skills necessary to learn how to use different online learning management systems, software, tools, services and applications related with digital leaning in general and with rhythm-based activities. In particular learning how to use specific devices for recording, tracking and sequencing progress was an example of becoming ICT proficient. Applying knowledge to solve technical problems and analysing what are the benefits and challenges for selecting devices or services tied with a specific learning objective was the focus. The capacity to solve technical problems students are experiencing across platforms, devices tools and services along with basic understanding on computing, coding and systems thinking was highly valued.

Themes	Sub-themes	Representative quotations
A: Designing, developing and delivering rhythm-based digital content	1. Designing digital content	*"knowledge in content design "*
	2. Developing digital content	*"…developing content related to rhythm, dance and music"*
	3. Representing digital content	*"identifying and selecting content. sharing and modifying content "*
B: Acquiring data, information and media literacy skills	1. Understanding and tracking student's progress through gathering and analysing data	*"To learn how to understand, record and analyse data about students"*
	2. Finding, accessing, using and sharing information	*"to know how to find and make available information about students"*
	3. Producing and editing digital media	*"To be able to digitally produce and edit sound/music"*
C: Developing skills in employing digitally and activity-led pedagogies	1. Collaborating learning	*"to be able to use collaborative tools for co-creation and solving problems together"*
	2. Inquiry and problem-based learning	*"Digital inquiry and problem-learning to initiate online research"*
	3. Activity and digitally-led assessment	*"I need to give careful thought on how to integrate assessment via using technology "*
	4. Multiple modes of feedback	*"now there is digital feedback and analogue. Need to integrate both"*
	5. Reflection	*"Reflection on how pedagogies, content, tools and assessment were designed"*
D: Becoming ICT proficient in digital learning environments,	1. Technical use of software and hardware for tracking, recording and representing	*"learning how to use a learning analytics tool, how to track performance how to filter based on*

devices, applications, software and services	progress and performance	*parameters and organise them "*
	2. Applying knowledge to solve technical problems with software and hardware	*"if I don't know how to handle technical issues students will be disengaged"*
	3. Selecting software, hardware and services based on learning and technical requirements	*"learning how to select appropriate software and hardware for managing content, learning and student needs "*
	4. Basic understanding of computing, coding and systems thinking	*"a bit of coding to help them create their own little rhythm projects" "not only using software but also develop software related to rhythm"*
E: Assessing existing and new digital skills	1. A spectrum of different digital skills associated with rhythm-based teaching	*"such an assessment to be more qualitative and give me the opportunity to explain and consider successes, problems and developments "*
	2. Associated metrics representing variation of the digital competence assessed	*"to have a hands-on approach and some metrics to understand your level "*
	3. Qualitative understanding of individual competencies may be practiced across different progression levels	*"having a variation of the skill required and assess the competence of the skill accordingly"*
	4. Comparing and sharing individual competencies with competencies acquired from fellow-teachers and other stakeholders	*"It is all about constantly measuring and comparing your skills with what the others are doing "*
	5. A record representing acquired competencies and an audit trail of new competencies need to be developed	*"to be able to identify my current competencies and what else would I need to learn in order to improve my teaching and be digital competent "*
F: Developing digital creativity skills, empathy and a do-it-yourself culture	1. Ideating, brainstorming and designing rhythm-based activities	*"planning for an idea and then designing it "*
	2. Personalising, sharing and re-	*"making the design relational to*

	mixing rhythm-based activities	*student interests ", "sharing my designs with others ", "taking bids from others and using them in my designs "*
	3. Empathising with students needs and interests for a custom activity design	*"creating a bond and a relation to learn habits and then try to apply in the design "*
	4. Producing tangible digital learning resources	*"creating musical models or other compositions through web2.0 collaborative tools with children "*
G. Digital professional development	1. Developing authentic rhythm-based experiences using sound, music and choreography	*"To be able to record our performance, watch it, do it again ", "to create an account in children laptops, so they are able to have all the songs collected there and maybe they can record songs"*
	2. Meaningful feedback on theory and practice	*"learn what feedback means, what technologies to use and what type of feedback to give"*
	3. Developing an online knowledge building forum	*"to learn how to build, interact and sustain digital communities "to share experiences with other colleagues about tools, processes and methods we use "*
H. Fostering student digital inclusion, social influence and relatedness	1. Embedding equal digital learning opportunities into the digital learning environment	*"Equal learning opportunities should be embedded into the design of digital material, activities, etc "*
	2. Acting as role model offering best practice examples in implementing technology	*"being able to use technology in an exemplar manner might help students to use technology in the same way"*
	3. Designing digital learning resources that are related to students' past experiences, feeling and emotions for increasing engagement and motivation	*"for me is key to design digital learning with rhythm that makes students to feel something, connected to something from the past like an emotion, an object, a location, a discussion with a parent, a colour..."*

Table 13: Themes, subthemes and representative quotations.

Theme E: Assessing existing and new digital skills

Participants felt that it would be beneficial to have access to a framework, model or a tool that would help them understand, monitor and assess existing digital competencies level but also to discover

new competencies that would be necessary to develop based on current professional demands. A structure that represents the spectrum of the different digital skills available to teach the rhythm-based curriculum in a thematised and sub-thematised way would provide an informed and comprehensive way to understand the breadth and depth of the different digital skills that could be developed at any scale. Participants stated that the framework could have metrics representing the variation of the competence and a grade-range denoting the level of expertise for a specific competence. Such a digital skills framework was viewed as tasks performed by teachers to have an awareness of how a particular digital skill may be acquired and practiced. The level of skills or expertise possessed should also be represented as the outcome of the digital skills assessment. It was mentioned by the participants that starting from the lowest level of expertise and having this reported then it would then encourage them to make conscious decisions on how to start developing their digital skills. Systematically measuring and tracking digital skills by having a set of metrics and an understanding of how individual competencies may be practiced across different progression levels. The framework also might help on comparting individual competencies with competencies acquired from fellow-teachers and other stakeholders. Some of the reasons for assessing digital competencies was for being aware of current digital skills, for enhancing the effectiveness of teaching and have a recorded evidence or audit trail of what worked well and why.

Theme F: Developing digital creativity skills, empathy and a do-it-yourself culture

It was prevalent from participants' responses that there is an internal need to develop skills that focus on digital creativity competences. Ideating, brainstorming and designing rhythm-based activities and lesson plans felt a key creativity skill for aligning student's prior knowledge and experiences to the intended learning activities, feedback and assessment as digital resources to be designed and orchestrated for a subject-topic. It was also perceived that there is room for plenty of editing, personalisation, sharing and re-use / repurposing / re-mixing of learning activities. Participants craved that they had the skills to select and use design for learning authoring environments that afforded the design, orchestration, sharing, use and re-use of rhythm-based learning integrated to their taught curriculum standards. Developing feelings and understandings of what students require whilst considering their learning and personal situations was also felt as a creative aspect in terms of making a conscious effort as part of a holistic and custom-design for learning process. Participants were keen on producing their own digital resources for learning and teaching (digital prototypes, games, simulations, instructional software, widgets, educational robots, tangible interfaces) and being part of the Do-It-Yourself (DIY) and establishing an identity culture and thereby acting as role models for empowering students to emulate DIY for crafting their own tangible products.

Theme G: Digital professional development

Continuous professional development was perceived highly important for developing competencies on rhythm-based teaching. There was evidence from participants' responses that certain micro-level competencies need to be developed for best-preparing teachers to use digital technology for rhythm-based teaching and learning. Developing authentic rhythm-based experiences by using rhythm-enabled technology such as sound and music technology tools, music instruments to learn how to play and other educational activities that show how to integrate rhythm through musical instruments, choreography and other artistic activities (e.g. painting) into the learning and teaching process. Another strategy was meaningful feedback in how teachers learn the theoretical aspects of

digital literacy but also how such aspects are applied into practice as to be regarded as usable competencies that may be applied for designing and delivering rhythm-based activities. Meaningful formative feedback was the key for understanding and applying feedback for improving performance. Developing online communities of teachers as means of establishing a forum with like-minded professionals for exchanging, developing sharing and situating different views, resources and aspects of technology use into different contexts as part of creating an online knowledge building forum (e.g. Scardamalia, 2004).

Theme H: Fostering student digital inclusion, social influence and relatedness

It was clear from participants responses that the way digital inclusion is fostered is a process that may be inherently designed in the learning content, materials, activities and tools designed and developed by teachers. Digital inclusion was about learning how to design digital learning environments that foster knowledge and learning to students with different backgrounds, learning preferences or to provide the means, adapted technology and choices for students with learning difficulties to learn through using technology alongside with their peers. Social influence is connected with best practice examples of digital technology use from the teacher and other stakeholders (e.g. parents, fellow-students) to act as role models and scaffolders in implementing technology for rhythm-based learning. Relatedness is the capacity to help students to be engaged and motivated through relating past experiences, knowledge, places, people or events to current digital learning experiences emanated from the use of technology. The underpinning capability is to design digital learning resources that are familiar to students and would trigger positive memories, feelings and emotions that would likely increase engagement and motivation and thereby learning.

3.2.6 Review on and analysis of the rhythm-based curriculum

In this section, we present a short literature review with regard to the impact of rhythm and dance (body movement) activities/interventions on vulnerable students' or students' with SEN psychosocial and learning function and on their effort to be successfully included in the ordinary school classroom. More specifically, we might have on various domains such as academic skills, psycho- social skills in order to show how all children and especially children with SEN might be positively influenced by such activities. The music therapy literature is full of explanations, well-documented theories and arguments about the development and value of improvisation and creative activities that promote child's individual potential (intra- and interpersonal skills) and collaboration in education and clinical work.

More specifically, music/rhythm-based activities and music therapy are considered/ constitute an essential tool, method and strategy to help "vulnerable" children and "children struggling with internal or external difficulties and adversities" at school, in the family or society. It is a child friendly and a child developmentally appropriated approach and method that can be used in order to "treat" or reduce various "symptoms", "problems", or "externalizing/internalizing and developmental disorders", such as hyperactivity, stress, anxiety, fears of exposure, extreme shyness (etc.), aggressive behaviour, emotional and behavioural disruptions, leaning difficulties, and so on.

Music and rhythm-based interventions (MRBI) are used to treat various child's dysfunctions/disorders, emphasizing the child's social, communicative, emotional and behavioural

skills. Specifically, the use of music/rhythm-based interventions focuses on the development of both interpersonal relationships and social interaction abilities in vulnerable children managing and reducing stereotypical behaviours. It also aims at developing the child's inner potential and creative skills, by promoting body movement and playful activities. It is worth noting that the MRBI is also used as a multi-sensory method for relaxation of children with high levels of anxiety and intense outbursts (Caria,Venuti,&Falco,2011).

At the same time, children and adolescents with developmental disorders also present a major difficulty in the field of communication, but music can act as a communication bridge and through musical synchronization to cultivate the child's ability to harmonize his behaviour (Geretsegger, Elefant, Mössler & Gold, 2014). Several surveys indicate (Simpson & Keen, 2011) that through music, music improvisation can develop enough child skills. It is noted that the child improves his eye contact, imitation ability by repeating his therapist's movements with the rhythm of his music. One of the main goals of music is to help the child understand his environment and take initiatives for social interaction, differentiating his / her social behaviour. Psychologists and special pedagogues who use music as a means of intervention try to use the pronouns "ego" and "you" in the binary session, aiming to understand the child's boundaries of personal space (Geretsegger, Elefant, Mössler &Gold,2014). Researchers Kim, Wigram and Gold (2009) used their music as a basic method of intervention by recording their sessions. The results showed that children showed intense feelings of joy and improved their behavioural responses while at the same time there was an improvement in children's motor and social skills.

Rhythm and dance –based activities to develop psycho-social skills

- Lowry et al (2018) in a research which involved pupils who took part in a ten-week drumming programme apart from the significant improvements in dexterity, rhythm and timing also observed highly important benefits on behavioural management such as improved concentration and enhanced communication with peers and adults. Dr Ruth Lowry, a Reader in the Psychology of Active Living at the University of Chichester, involved in this study, refers to the impact of drumming: "The opportunity to see this group of children progress and develop through developing skills in music is powerful. We hope that this project will provide further evidence that not only does rock drumming have positive benefits in terms of changes in dexterity and concentration, but that wider social and behavioural conduct benefits can also be observed."
- Boso et al (2007) in a study involving 8 young adults with autism who took part in a total of 52 weekly active music therapy sessions lasting 60 minutes, suggest that these sessions were of significant aid and reduced behavioural difficulties that these adults were facing.
- Fitzpatrick et al (2017) raise an important issue regarding the ASD-specific social deficits and how these may interrelate with the social motor synchronization that takes place when interact physically with others. Amongst their findings, what seems relevant to this review is that objective dynamical measures of synchronization ability and motor skill could provide new insights into understanding the social deficits in ASD that could ultimately aid clinical diagnosis and prognosis
- Srinivasan and Bhat (2013) suggest that most of therapy sessions in and out of the classroom environment involve rhythm- based activities which enable children with ASD as

well as with other developmental disorders to develop communication, social-emotional, and motor development skills.

- Willemin et al (2018) presenting a pilot study which involved eight one-hour sessions of a novel dyadic within-group drumming program called 'Drumtastic' for children with ASD concluded that children who participated in the study significantly improved in the domains of enjoyment and fun, and showed a positive trend for developing improved social relationships with peers and adults

Rhythm and dance –based activities to acquire linguistic skills

- Ruddock (2018) drawing on Gadamer and Dewey' s theory suggests that music enables cultural development and questions the value of a practice that leaves many of us musically disabled. He shows that the use of rhythm and/or dance activities facilitate the acquisition of linguistic skills for typically and non-typically developing students
- Linavally et al (2018) also argues that rhythm and dance based activities can promote skills such as syllable discrimination, verbal memory, and acquisition of prosody in young children with and without SEN
- Furthermore, Corrigal et al (2011), Anvari et al 2002 and Gromko (2005) present their studies where it is shown that children who systematically attend rhythm and dance-based activities seem to develop early reading skills, vocabulary as well as phonemic awareness.
- It is well proven that music and language are characterized by common aspects such as grammar and a system of common conventions and thus as Harisson and Pound (1996) suggest the integration of music in every-day school activities can play a determinative role in the acquisition of abilities relative to speech especially for children with SEN.
- Register et al (2007) determine the efficacy of using music as facilitating activity to enhance the reading skills of second-grade students and students who have been identified as having a specific learning disability (SLD) in reading. Analysis of pre/post-test data revealed that students with a specific disability in reading improved significantly from pre to post on three subtests: word decoding, word knowledge and reading comprehension.

Rhythm and dance- based activities for the acquisition of mathematic skills

- Miller (2013) suggests that carefully planned mathematic sessions where music-based activities are integrated alongside with the general curriculum's objectives can promote engagement and understanding for all students with regard to the area of mathematics. In her account, when music-based activities are integrated in the instruction of mathematics, students and teachers benefit in terms of academic and social skills
- Chahine and Montiel (2015) conducted a study where they examined the impact of the use of music on teachers' efficacy. 15 mathematics teachers were trained in order to students' understanding of mathematical modelling using musical rhythms. They showed that when teachers are engaged in teaching mathematic skills through less traditional ways, including the context of music, they were confident that such experiences can be effective in stimulating student learning. Furthermore, the study argues that the use of musical rhythm in teaching mathematics has a great impact on teachers' self-efficacy.

Rhythm and dance- based activities for the acquitition of motor skills

- Gradinaru (2015) suggests that integrating rhythm in every-day physical exercise in schools is the key to the development of motor skills including direction skills, coordinative and expressive skills). She argues that the use of music in school sport classes can improve kinetics and vestibular sensitivity
- A similar study shows that gymnastics through rhythm facilitate the development of motor skills focusing specifically on the development of sensor, motion (physical) artistic and creative abilities, and capacities (Novotna and Slovakova 2016)

Analysis on Rhythm-based curriculum

Do you perceive that you could introduce and deliver a rhythm-based curriculum aligned with objectives and associated activities as part of your standard national curriculum?

QUESTION 1 /ANSWERS	N(%)
Yes	29 (78.4%)
No	4 (10.8%)
In part of specific areas	1 (2.7%)
Partially Yes	1 (2.7%)
Not sure	1 (2.7%)
It could be but Maths, English and Science are strongly prioritized by management	1 (2.7%)

Table 14: Responses of participants to the question: "Do you perceive that you could introduce and deliver a rhythm-based curriculum aligned with objectives and associated activities as part of your standard national curriculum?"

What do you mean by a rhythm-based curriculum? Could you please give an example?

-*Using rhythm (with a structure program) in daily teaching* (including several domains of learning) (23 participants)

-*An alternative way of teaching using it occasionally in class* (2 participants)

-*Music and dance in classes* (8 participants)

-*Culturally adjusted curriculum* (1 participant)

(3 teachers didn't 't complete the question)

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Using rhythm (with a structure program) in daily teaching (including several domains of learning).	*Rhythm and movement have a dominant position and interact horizontally and vertically with the other cognitive objects,* female preschool teacher

	the inclusion of rhythm throughout the curriculum and as a subject in its own right, Female primary school teacher, UK
An alternative way of teaching using it occasionally in class	*I don't think that we can use it all the time our lesson. I feel that doing that all the time the student will be bored. I think that we can use the rhythm based occasionally and in some particularly sessions,* male primary school teacher
Using music, dance and art in several subjects in schools	*Use music and dance in many subjects,* pre-service school teacher
Culturally adjusted curriculum	*A model of learning curricular subjects with cultural expression,* Female primary school teacher, Sweden

Table 15: Meanings of rhythm-based curriculum

In which subject areas you perceive that rhythm-based activities may be designed for?

-*In all subject areas* (13 participants)

-*In certain subject areas* (e.g. maths, biology, language, art, physical education) (23 participants)

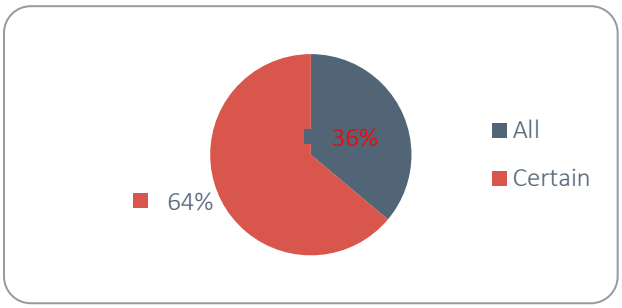


Fig. 14. Answers of school teachers to the question: "In which subject areas you perceive that rhythm-based activities may be designed for? "

Do you perceive that time constraints may prevent you in implementing rhythm-based activities?

ANSWERS	Number of participants
Yes	23

No	10
Maybe/ Sometimes	3
No answer	1

Table 14: Constraints in implementing rhythm-based curriculum

Could you please explain why do you think so?

PARTICIPANTS THAT ANSEWERED **YES** IN Q4

15 participants mentioned that the official curriculum is time pressure and difficult to change

"because in a curriculum we could include the problem of time", Female, Greece

"Standard ways of teaching cannot be changed easily at a national level", Female, UK

There is a lot of pressure for children to write in their books about almost everything they do, it is difficult to reconcile this with doing activities that do not involve writing in books, Female, UK

8 participants mentioned that it needs extra work on behalf of teachers

It *will take lots of time to organize lessons like that so I wouldn't do it daily* , Female, Cyprus

Beginning the project, finding materials, finding opportunities in the national curriculum, designing rhythm sessions will all take time and effort beyond normal teaching, but it should be possible and worthwhile, male , UK

it takes time to design something innovative and with rhythm inside, male, UK

PARTICIPANTS THAT ANSEWERED **NO** IN Q4

Five participants answered that on kindergarten they don't have the pressure of time management ,

The program of kindergarten, more than any other, enables the teacher to manage the time according to the pupils' abilities and needs", female, Greece

3 participants mentioned that if it is organized there will be no problem of time

Providing the school is equipped well with technology any amount of time will be enough, Female, Cyprus

One teacher mentioned that this is an Obligation of teachers

"*because this is the role of the teacher to creatively try new things for improving learning",* male, UK

PARTICIPANT THAT ANSEWERED **MAYBE/SPMETIMES** IN Q4

-Depending on the daily educational goals (2 participants)
"Pressing timetables for certain results with children", male, Greece

What other challenges would you think of in adopting the curriculum and its associated rhythm-based activities?

-*Reactions of others* (parents, colleagues), 8 participants
-*Children's characteristic s and attitudes*, 8 participant
-*Practical issues* (financial support and specific skills), 14 participants
-*Don't Know* / No specific answer, 6 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Reactions of others (parents, colleagues	*parental and colleagues reactions; they may believe that traditional/ basic topics would be neglected or that tense activities are playful and do not serve the purpose of learning as it is formally conceptualized in our school culture,* male primary school teacher, GR *Lack of rhythm knowledge,* Female, Sweden
Children's characteristic s and attitudes	*Challenges could refer to students with difficulties. Pupils in the spectrum of autism, with attention distraction or with behavioral problems could benefit from the application of a similar program,* female preschool teacher, GR *willingness of children to adopt it and experiences of parents whether they would feel as something engaging for students* , male, UK
Practical issues (financial support and specific skills)	*Financial ones, a huge problem here in Greece, also equipment supplies,* female nursery school teacher, GR *Acceptance by senior management of rhythm based learning as a valid teaching strategy. Resistance by less*

	musically proficient staff to having to use music outside of music lessons, male, UK
Don’t Know / No specific answer	I don't know

Table 15: challenges in adopting a rhythm-based curriculum

How do you think that a rhythm-based curriculum may benefit your student’s learning? Could you please give an example?

-*Facilitating the learning process*, 19 participants
-*Enhance communication among students*, 7 participants
- *Enhancing students to their Development*, 11 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Facilitating the learning process	*the rhythm is interwoven with man since the beginning of his life. The movement is necessary for the child to first explore himself and then his surroundings. Rhythm and movement are cognitive tools. He uses it to enrich his existing knowledge*, female preschool teacher, GR *It will make learning factual information fun and more memorable, even when the subject matter is not inspiring (English spelling, number facts), It will make all this learning more accessible to less able children and children with specific difficulties”,* male UK
Enhance communication among students	*enhance communication and collaboration* male, UK
Enhancing students to their Development	*“Our goal is the full development of our pupils. Rhythm helps that”*, female nursery school teacher, female, GR *“through having a multidisciplinary way of embedding rhythm into different topics. Imagine the possibilities a*

	student or be able to see connections between dance and maths. A new world opens for him / her" , male, UK *"It's a whole brain activity and makes connections that go beyond learning of facts into thinking and acting in the real world",* Female, UK

Table 16: Benefits of the rhythm-based curriculum

How do you think that a rhythm-based curriculum may benefit your student's engagement and motivation?

-*Motivation, mentioned by* 11 participants
-*Concentration and discipline,* 5 participants
-*Enhance communication/ Commitment to achieve a goal,* 11 participants
-*Facilitate expression of students and self confidence,* 7 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Motivation	*Rhythm enhance motivation*, female pre-service teacher, GR
Concentration and discipline	*by increasing concentration and internal discipline,* female preschool teacher, GR
Enhance communication/ Commitment to achieve a goal	*It strengthens attention, experiential learning and integration into the group*, female preschool teacher, GR
Facilitate expression of students	*They may start be more communicative and express their feelings better and their motion ability and their creativity*, female, UK *It can be more fun for them to learn in a way that is active and centered around the students' imaginations instead of sitting with a book. We will expose more*

	talents in our students and provide more opportunities for affirmation and self-confidence, male Sweden

Table 17: rhythm-based improvements for engagement and learning

What do you think is your role as a teacher in delivering rhythm-based activities?

-*Facilitator/Co-coordinator/Creator of rhythm-based activities*, 29 participants
-*As part of a team/Enjoyable role*, 4 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Facilitator/Co-coordinator/Creator of rhythm based activities	*mediator and at the same time a member of the team that explores, expresses and creates*, female preschool teacher, GR *To identify the opportunities within the curriculum to use rhythm based learning, To find or develop rhythm based learning sessions. To deliver those sessions. To assess the impact of those sessions*, male UK *Presenting students with new learning activities in a confident and inspiring way so that they also become excited and participation*, male Sweden
As part of a team/Enjoyable role	*To feel certain for myself and be part of the team*, female preschool teacher

Table 18: Teacher's role

What do you think is the role of the student in employing rhythm-based activities?

-*Playful*, 1 participant
-*Active in participation in all the stages of the process*, 28 participants
- *Exploring and applying knowledge*, 7 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Playful	*as children who play*, female preschool

	teacher , GR
Active in participation in all the stages of the process	*Student could participate in such activities by playing an instrument or doing concerting actions with parts of his body,* pre-service school teacher, GR *To attempt to participate.To exercise self-control so that they work as part of the team. To listen to their peers and adjust their performance. To attempt to remember the session*, male, UK
Exploring and applying knowledge	*a person with up-to-date knowledge and experience exploring new areas of potential and experience*, female preschool teacher, GR *to pose questions and respond to questions asked by others*, male UK

Table 19: Student's role

Why do you think it is mostly relevant to you to be further trained in adopting a rhythm-based curriculum?

-*To be more effective as a school teacher*, 6 participants
-*Enrich knowledge/Personal Development*, 28 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
To be more effective,	*to be more effective*, female preschool teacher, GR *To do the best for the students,* female preschool teacher, GR

Enrich knowledge/Personal Development	*I want to enrich what I already know*, female preschool teacher, GR *We need changes in school. We need to develop new, better options for teaching lessons. We need to have the courage to expand traditional learning*, male, Sweden *I am an arts leader and it would be part of my professional development*, female, UK

Table 20: Importance of training

How do you think you can be best trained in adopting the rhythm-based curriculum proposed by the project?

-*Training*, 22 participants
-*Technology*, 8 participants
-*Implementation*, 11 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Training	I *believe good ways of training are experiential teaching by suitable musicians, use of digital media (video) referring to rhythm and movement. Also, guidance on the implementation of these activities in the classroom*, female primary school teacher, GR
Technology	*I believe good ways of training are experiential teaching by suitable musicians, use of digital media (video) referring to rhythm and movement. Also, guidance on the implementation of these activities in the classroom*, female preschool teacher, GR *On-line tutorials. Examples of lessons where it has been successful*, Female, UK

Implementation,	*by realizing ant "testing" it*, female preschool teacher, GR *Certainly there must be a collaboration of scientific associates with the class teacher. Designing activities by the teacher with the help of scientific leaders, implementation of activities, evaluation and reflection. Participatory and collaborative training to create new knowledge,* female preschool teacher, GR *By participating in example sessions and following that with discussion of both the factual and the deep learning that went on during that session*, male UK

Table 21: Best practices in training

What might be the benefits of these activities for the students with SEN/ emotional-behavioral or learning /developmental difficulties?

-*Equal participation in class activities/Engagement*, 7 participants
-*Beneficial in emotional, educational and social level,* 28 participants

THEMATIC CATEGORIES	INDICATIVE ANSWERS
Equal participation in class activities	*I think that most of them will benefit these students. Apart from the fact that they will learn in an experiential way and will be actively involved in the educational process, they will feel that they are equal members of their class. All this will help them to develop their self-esteem, an essential feature for their lives,* female preschool teacher, GR *It will give them the joy of participate,* female Cyprus

Beneficial in emotional, educational and social level	*they will have self confidence that they can achieve goals*, female primary school teacher, GR *That they'll feel more confident about themselves, they'll be included in the team, they'll be happie*r, female preschool teacher, GR *more confidence, better memory. physical movement benefits* , female, UK *improving self-esteem and confidence to communicate* , male UK

Table 22: Benefits for students with SEN

4 RECOMMENDATIONS AND CONCLUSIONS

In this section we provide recommendations for the development of the main outputs of the Rhythm Project mainly: (1) The Rhythm-based curriculum, (2) the digital competencies framework for rhythm-based teaching and (3) the online courses to be developed as means to help teachers to integrate creative, participatory and pedagogically-driven rhythm-based teaching in their practice.

Recommendations for the design of the Rhythm-based curriculum are

1. Orientation exercises
2. Awareness exercises (sensory exercises)
3. Exercises to improve understanding and expressiveness
4. Flexibility exercises
5. Interaction and communication exercises
6. Creativity exercises
7. Sensory-motor exercises

Recommendations for the digital rhythm-based competencies framework are

1. Balancing, connecting and integrating the digital competencies framework with the rhythm-based curriculum and the online courses
2. Contemplating on relevant criteria that will encompass digital content, data, information and literacy skills, activity-led pedagogies, digital learning environments, devices, applications,

software and services, assessing new and digital skills, digital creativity skills, professional development, student digital inclusion, social influence and relatedness
3. Align rhythm-based competency themes to different progression, competency stages and proficiency levels
4. Quantify each proficiency level from each category and sub-category to comprise a total average mark for existing and new competency identified by teachers.

Recommendations for the online course are

1. A template to be developed with relevant criteria such as learning outcomes, prior knowledge, skills to be developed, learning activities etc. for partners to create their courses in a consistent way adhering to certain topics.
2. Rhythm-based curriculum and the rhythm-based digital competency framework will inform the design, structure, implementation and assessment of the skills and outcomes gained from attending the courses.
3. The design of the courses should allow for comprehensive support from feedback, notifications, assignments etc. with a minimal need of a facilitator.
4. The transition of what was learned in the online courses to how it may be practiced in-real classroom environments should be supported, monitored and communicated in regular intervals between the trainers and the teachers attending the courses.

This report provided a description on and analysis of the data for eliciting what the users perceived as necessary and useful for designing their rhythm-based learning activities. To this line we presented background information on the results stemming from the design-thinking workshops in Crete, the survey results for identifying how teachers from Sweden, Greece, England and UK perceive the potential of designing, orchestrating and assessing the rhythm-based curriculum and associated digital competencies to be developed for allowing the twinning between rhythm-based activities and the use of technology for blended or distance rhythm-based teaching and learning.

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APPENDICES

Appendix 1 – UK Crete Workshop Report

Who will this project would impact upon?

Children:

The first stake holder we discussed were the children. This could be children with special educational needs or not. All children would need to feel included and this must be taken into consideration when using rhythm strategies. It may enable some child with needs such as adhd or add etc be

included but could disengage some more academic children who would find the break an intrusion into their thought process and therefore may hinder their learning.

Class teacher:

The second most important stakeholder we suggest is the class teacher. Class teacher buy in is essential to enable this project to be trialled. However teachers different skill set and confidence levels will affect the degree of buy in and delivery and therefore impact for children. Teachers wish to be inclusive, creative and resourceful, but must do this within the constraints of time, curriculum and budget. So good teachers look for creative, inclusive activities related to the curriculum that bring the maximum gain for the smallest cost in time and money.

School Management and governors:

School management require high levels of evidence and assurance about the effectiveness of activities and initiatives before they will commit funds to training in then. Other stakeholders include SLT and school governors. Especially if there is a financial constriction or buy in SLT and governors would need evidence of results of impact to decide to participate. To take the learning from this project deeper and to engage more teachers we believe that delivering training to teacher training providers such as universities etc would have a huge impact. NQT teachers would start their careers with these evidenced based strategies.

Parents:

Parents are a huge stakeholder in this project but often forgotten. It is vital that key Information about these strategies is shared with parents so that they can also use these strategies with children to help their progress. Children spend more hours of their week at home and therefore parents are the primary educator of their children.

Context for the project:

Three critical factors of the educational context in England will affect the project:

- Firstly the national curriculum (and associated local government or academy curricula), the delivery of which makes school time a precious resource.
- Secondly, the workload of teachers, most of whom work many evenings and weekends in order to stay abreast of their classes and administration.
- Thirdly, the financial environment of the schools, in which funds are scarce and every pound spent must be spent in a demonstrably effective way.

One of the largest challenges that teachers face in England is the national curriculum. This document sets out the legal requirements for what all teachers must follow and teach. Therefore, we believe that R4I cannot be a new curriculum but should be strategies which teachers can implement to support and deliver the National Curriculum. This could be at whole class level or directed at particular pupils to meet an educational need or an emotional need which would then enable them to access their learning more independently.

https://www.gov.uk/government/collections/national-curriculum

In addition to this we believe that it is important to know and take into account the local context to identify how R4I could be used. In Coventry and other cities in England it has been identified that early language skills are a concern. Therefore, developing these skills is vital and R4I could be used to develop these.

Deep Learning linking to the project:

Moving on to the project itself; the Rhythm for Inclusion model is a type of activity or strategy that is already well supported in the English language educational literature although it's specific form using rhythm, music and dance appears new.

Considering Rhythm for Learning in the light of the literature, we think that it will provide deep learning and psychosocial benefits for children along the following lines:

- Speech and communication – singing is a great way to vocalise thoughts. Singing activities are sufficiently engaging that a higher proportion of children engage more fully. Singing can develop team work skills.
- Self-confidence and self-esteem – during musical and rhythm activities all children can experience success. Children develop self-control in keeping a rhythm and expressive dance.
- Outlet for emotional expression / communication of emotions – including need such as anger, excitement, worry, anxiety, sadness, rage etc
- Behavioural and emotional literacy – rhythm and dance advance relational learning and empathy
- Motor skills and coordination – increased levels of motor and sensory skills. Dance and rhythm activities develop coordination skills
- Growth Mindset – Improved well-being. Relaxation, respiration rates and lowering anxiety and physical concerns.

We also consider that that deep learning will be beneficial to children in small groups or whole classes, with children engaging with that learning at their own level (with careful management by the teacher).

However, without clear links to the National Curriculum, this type of activity or strategy is currently considered a luxury by most school management teams, given their time and financial pressures.

So, to be enthusiastically received by good teachers and school management, Rhythm for Inclusion must go beyond is musical and artistic focus and include aspects of the curriculum.

Implementation of the project

We have identified the following areas where the Rhythm for Inclusion model could be used both for it's deep learning potential and psychosocial benefits to improve learning in one or more National Curriculum areas. We further believe the deep learning and psychosocial benefits of rhythm for learning will be multiplied if teachers use it regularly, and that it's regular use is dependent on it being part of curriculum delivery.

We consider that following National Curriculum areas have good potential for delivery using Rhythm for Learning:

- Phonics – Learning phoneme and grapheme correlatiuo9n to develop reading a decoding skills.
- Maths – learning mathematical facts – multiplication, number bonds, simple addition etc
- MFL –Learning the vocabulary of foreign languages
- Rhyme – developing an awareness of rhythm and rhyme for young children
- English – learning native language skills – linked to local context of need – key skills such as prepositions
- Topic specific learning – science, history, geography etc concepts such as photosynthesis

Practicalities:

It is essential for computer content to make clear and explicit links to curriculum and be easily implemented by teachers.

Any training given should be provided in small clips eg. 2 minute videos

Example of 'What a good session looks like'.

Few teachers in England are accomplished musicians and many believe themselves not to "be musical". Such teachers will struggle to find time to learn to play a musical instrument to a standard at which they are confident to use it with children, so good, reliable recorded music will be essential to uptake of Rhythm for Inclusion.

Appendix 2 – Sweden Crete Workshop report

In the Swedish workshop we discussed

1. The children with special needs are integrated in class with a class teacher with little education in special needs. The headmaster support with 'a sensible person' without education in order to avoid other children in class to be hurt.
2. If the teacher has 'extra energy and minutes' there can be support finance to apply for.
3. Sweden group presented 'the real story': Erika O'Neill has herself experienced not being capable of tossing ball and other coordinative movements when starting school. A dance teacher

was with her (financed by Culture in School) and made her move slowly making angelwings with arms and after adding waving skirt with legs and adding music. Erika had rehearsal/coordination training two lessons a week (in maths hour, because she added 1+1=11 and 2+2=22 etc) and was very overactive and noisy. Erika says: 'If I did not find dance, I would have been criminal today'.

Appendix 3 – Cyprus Crete Workshop report

Each member has selected a random card with a different theme and image. Each one of us shared our first thoughts when we saw the card and afterwards, each card was linked with the following one and the following story was created:

1. **People**: A scared boy in a scaring environment (e.g in a classroom).
2. **Activity**: To express music and rhythm with colours. It's the first fear that a child/student face in a formal teaching class environment, that suddenly becomes an informal teaching space.
3. **Activity**: Through the process of teaching/learning curriculum, the student has the opportunity to gain skills but also to reject and face stressing situations/experiences. The development is a step by step learning process like climbing a mountain.
4. **Context**: Although there are difficulties in climbing, the child/student gets easily adapted in changing situations. The mind of the student is open to new environments and situations, with no stereotypes. Rhythm/dance/music is the tool for the teacher to enrich the formal curriculum and support diversity in the classroom.
5. **People**: The alternative methods used based on rhythm/music/dance will help students to reach their goals and support them in their self-development, self-confidence and communication with peers.
6. **Activity**: Students will be able to co-exist in an inclusive environment. Diversities could be part of the personal characteristics of each person. Students, through their own rhythm, each one with their own differences, they can all become part of the same teaching experiences. We have called that a **Person centered learning rhythm**.

   Conclusion: They will all climb the mountain in their own rhythm. Technology and nature co-exist for the smooth and enriched development of the student.