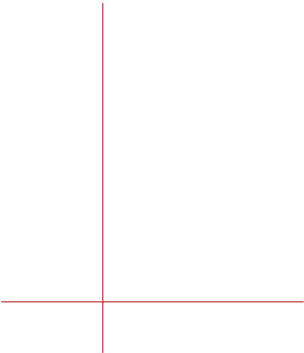


Virtual Music School

User-centred plan





VEMUS Project IST – 27952

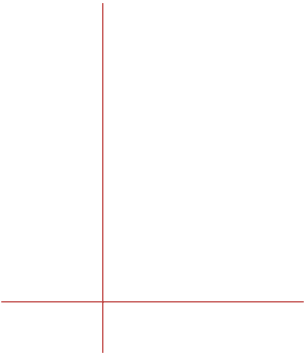
User-centred plan

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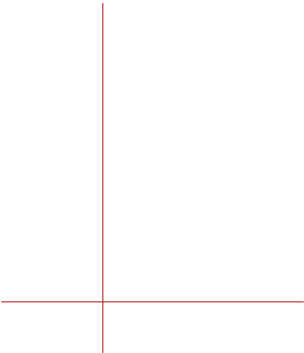
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RE	Restricted to a group specified by the consortium (including the Commission Services)	X
CO	Confidential, only for members of the consortium (including the Commission Services)	



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Introduction

VEMUS adopts a strongly user-centred approach, with user groups actively participating throughout the lifetime of the project. In the course of the VEMUS design development, evaluation and validation phase the scope of user profiling is manifold.

First, in the **user requirements elicitation phase** the consortium will try to identify the user needs and current practices, and establish the VEMUS user types, also called personas, that will be met again and again, during the other phases of the project development and eventually in its business deployment. In this phase we investigate with workshops and questionnaires the practices and activities of music teachers and music learners, in particular those involved in the teaching and learning of instruments, the clarinet, the saxophone, the flute, the trumpet and the recorder. As will be shown later in this document, the use cases that emerged from the workshops contributed to the definition of user types.

Secondly, during the **evaluation phase** knowing the profile of the user helps in identifying the parameters that are expected to be affected by the introduction of the innovative VEMUS system. It is also necessary to base the design of the evaluation studies on the characteristics we know from the user requirement elicitation phase. User profiles met in the IMUTUS evaluation period and results from the validation/evaluation studies should also be taken into consideration.

Third, in the **validation phase**, where new users are recruited to enter the validation activities, it is very useful to know what is the user profile we are looking for to attract in the validation activities. It is anticipated that during the validation phase the system will be exposed to non-typical use, other than that described in the controlled environment of the evaluation studies. The high participation of user groups brings to the project the opportunity to develop its approach at an even larger scale and to address critical factors that will provide the basis for wider subsequent deployment initiatives. We anticipate not only difficulties but also new opportunities in the attempt to integrate the VEMUS system in real school environments. The aim of the validation phase is to verify whether the objectives of the VEMUS project are met in a realistic environment of use. Preliminary validation activities carried out by IMUTUS clearly showed a strong potential for the concept and approach. VEMUS will scale-up validation activities to obtain more coherent and statistically meaningful results and to identify the critical factors for wider deployment. The validation activities will start after the final delivery of the VEMUS prototype (including the three different environments) on month 25 of the project's life cycle. For the first period of validation (Month 25 – Month 30) a series of small scale validation activities will be designed and implemented such as validation workshops, info days organised by national authorities or partner institutions in their countries, etwinning activities between schools. For the second period of validation (Month 31-Month 36) a series of wider scale validation activities will be designed and implemented, such as Virtual Music Festivals, Contests for young composers, Music Summer Camp.

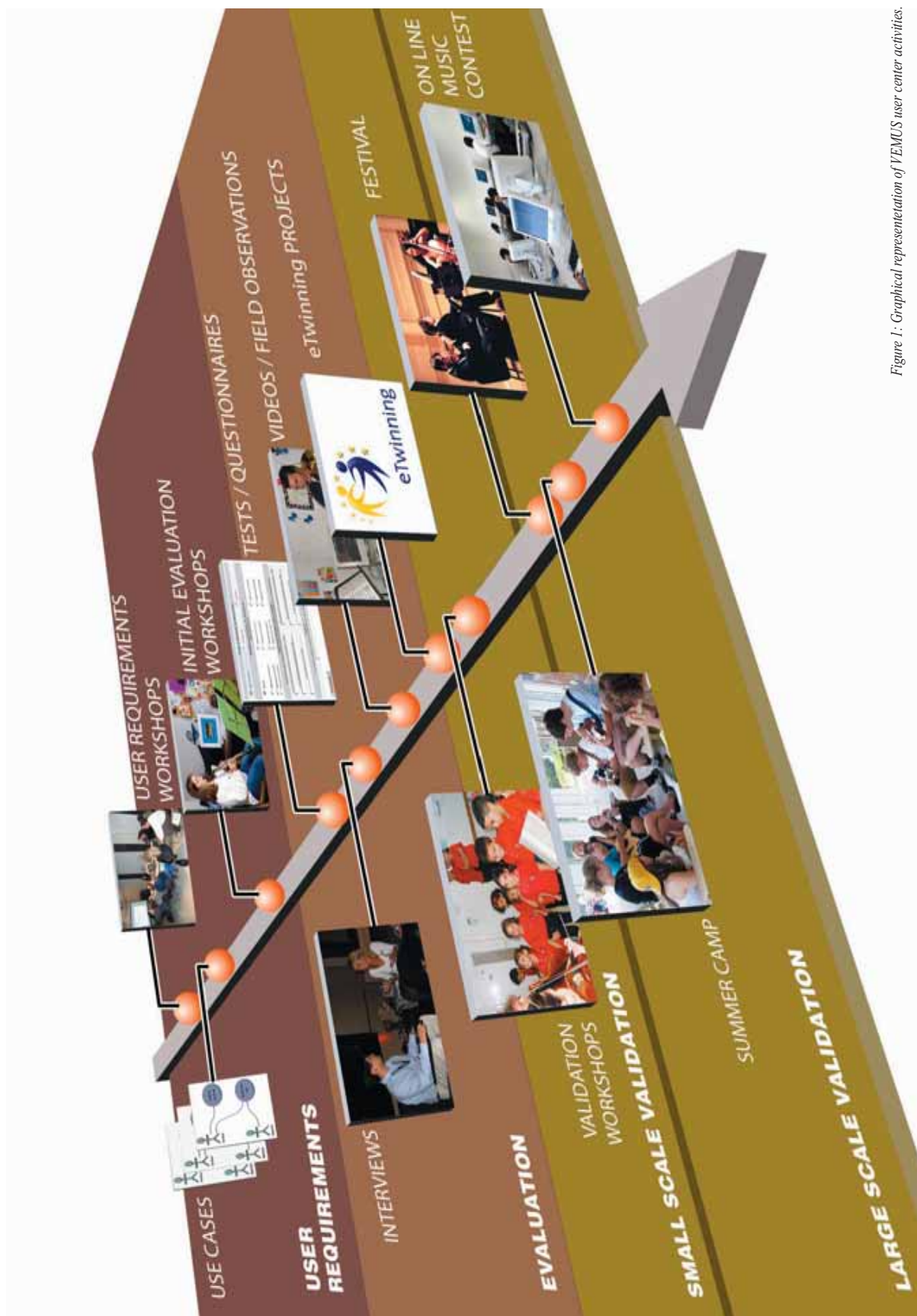


Figure 1: Graphical representation of VEMUS user center activities.

1. Users profiling

1.1 User groups and networks organisation

The VEMUS partnership spans to 6 countries, 3 of which are new or candidate member states; Lithuania, Estonia, and Romania. The partnership includes a Estonian partner (Miksike) with a lively learning portal that is daily accessed by more than 25000 learners and a Romanian partner (TEHNE) that is a non-profit organization with the main task of supporting educational initiatives covering the areas of technology-enhanced learning.

These partners will exploit existing cooperation links and will act as local dissemination centers for the project in the respective countries, forming and coordinating networks of user groups, organizing and carrying out workshops and other related activities. The VEMUS user group network will cover Estonia, Latvia, Lithuania and Romania. This network will help achieve a wider spread of the project results and raise awareness on music e-learning.

Overall the VEMUS consortium involves user groups from:

- EA music and conventional school
- A network of 9 conservatories in different cities in Greece (Nakas)
- Three music schools in Sweden under subcontracting:
 - o Nacka Musikskola (<http://skolor.nacka.se/musikskolan>)
 - o Solna Kulturskola (<http://www.solnakulturskola.se>)
 - o Stockholms Kulturskola (<http://www.kulturskolan.stockholm.se>)
- two partners from new member states with experience on e-learning and built e-learning networks:
- An Estonian partner (Miksike) with a lively learning portal that is daily accessed by more than 25000 learners (teachers and pupils).
- A Romanian partner (TEHNE) that is a non-profit organization with the main task of supporting educational initiatives covering the areas of technology-enhanced learning.

The network of user groups will be extended by dynamically involving more groups from music schools and conservatories in additional countries, especially focusing on the new member states.

1.2 User and user group profiling

With regards to the profiling of the users and user groups it becomes apparent that certain characteristics need to be known before assigning groups to evaluation studies and validation events. For example, user groups with limited experience in Open and Distance Learning application (ODL) are unlikely to be assigned to validate the distance learning environment or indeed if they are it should be considered in the results analysis. Similarly, special measures need to be taken to evaluate or validate a classroom environment with more than one student in Greece where one-to-one tuition is mainly the standard practice. Furthermore, when interpreting the results of either the evaluation or validation phase it is important to know the background of the users and other stakeholders that take an interest in the use of the VEMUS system. Table 1 and 2 present the different types of the potential VEMUS users and their distribution in the participating countries. The groups of users that are presented in Table 2 are the groups that will support the design of the system during the two first phases of the user centred activities (requirements elicitation and evaluation activities). The users in Esthonia will mainly involved in the validation phase as the group is not well identified at this phase. For the validation purposes new users groups from the same categories will be identified.

Table 1: The different types of VEMUS users

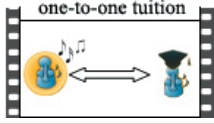
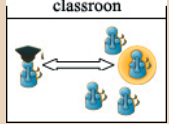
User	VEMUS environment	User
1. Student using VEMUS at home		
2. Student user in one-to-one face-to-face tuition using VEMUS		6. Teacher in one-to-one, face-to-face tuition using VEMUS
3. Student user in a face-to-face-classroom using VEMUS (performing; following)		7. Teacher in face-to-face classroom using VEMUS
4. Student as a remote user of VEMUS		8. Teacher as a remote user of VEMUS
5. Student in a remote music classroom using VEMUS		9. Teacher in a remote music classroom using VEMUS

Table 2: The user groups in the different countries that will be used for the two first phases of the user centred activities (requirements and evaluation)

	Sweden	Greece	Lithuania	Romania	Estonia
	6 teachers	9 teachers	2 teachers	3 teachers	NA
	60 students	39 students	10 students	15 students	NA
User	ALL	ALL		ALL	ALL
1. Student using VEMUS at home	X		X		
2. Student user in one-to-one face-to-face tuition using VEMUS	X	X	X	X	
3. Student user in a face-to-face-classroom using VEMU	X		X		
4. Student as a remote user of VEMUS	X	X	X	X	X
5. Student in a remote music classroom using VEMUS		X		X	X
6. Teacher in one-to-one, face-to-face tuition using VEMUS	X	X	X	X	
7. Teacher in face-to-face classroom using VEMUS	X		X		
8. Teacher as a remote user of VEMUS		X		X	X
9. Teacher in a remote music classroom using VEMUS		X		X	X

2. Requirements Elicitation

The procedure of requirements elicitation can be described through two basic flows of information (see Figure 2). The first is the linear flow of information which extends from the consolidated user input -gathered for example through thematic discussions and activities during workshops - to the definition of use cases, i.e non-technical descriptions focusing on functionality, interaction and pedagogical considerations rather than implementation and technical details. The issues that are raised with the definition of use cases are exposed to a second cycle of feedback, during which renewed user input is invited. This feedback procedure also helps introducing and testing new ideas and design patters. This is very important for VEMUS since it includes many innovative aspects that call for exploration of new possibilities rather than just elicitation of existing needs.

The output of the second round will be very crucial for the definition of VEMUS functionality. The contribution of experts on ICT-based music education is highly valued here. This is mainly because some of the teachers' feedback, especially on innovative aspects, may be based on guessing rather than judgement, since they have no relative prior experience and have not seen similar systems to have a clear view and appreciation of the benefits.

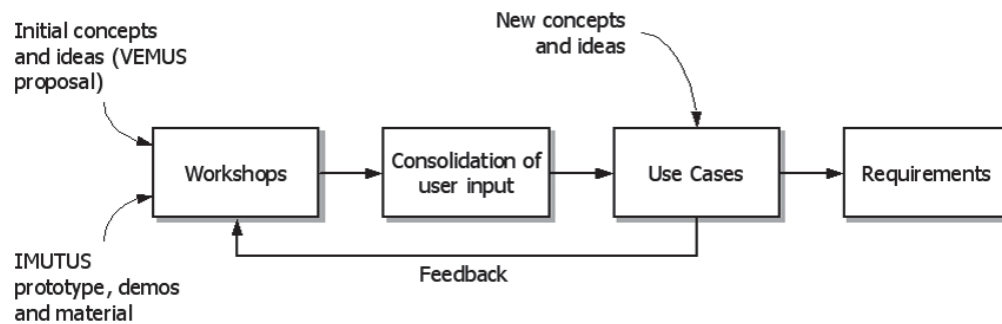


Figure 2: The procedure of requirements elicitation

VEMUS introduces a number of highly innovative features both in the interaction with the system and in the form of collaboration that provides to learners and teachers of music. The most efficient way to design such exploratory features is in-context, through direct interactions and feedback from the users. More specifically, 'in-context' conditions are created by allowing the teachers and the students to interact with software application that may provide similar features but they do not include the overall innovative approach of VEMUS. It is particularly difficult to require from the users to propose innovative features without getting accustomed with the potential than ICT and ODL may offer in the teaching practice.

2.1 Requirements Workshops

The main aims for the organization of the workshops are the following:

- To trigger discussion around the functionalities of the IMUTUS and other systems that share the same scope as VEMUS
- To reflect on advantages and disadvantages of these systems
- To discuss pedagogical requirements
- To gain an understanding of differences in the countries of implementation (Greece, Sweden,

Lithuania, Romania, and Estonia) with regards to music education needs and requirements as well as differences in teaching practices between countries

The pedagogical aspects on the implementation of performance evaluation and feedback strategies are critical issues in the design of the different environments of the VEMUS platform. In the framework of the proposed activities the IMUTUS system will be used as a demo case to introduce the participants to the VEMUS approach and in general to the use of technological tools and application for learning and teaching music.

Teachers of music theory, clarinet, saxophone, flute, recorder, flute, clarinet, and saxophone will be invited to attend the workshops. Additionally experts in the field of music education as well as educational policy makers will be invited to present the current status of music education in different countries. The workshops could be recorded and the content should be analyzed informally to have a clear understanding of how the workshop objectives are tackled and what further issues and questions are raised.

Initial Pedagogical Considerations

With regards to pedagogy, exploring users' activities and practices may be directed towards the following issues:

How should computer-based accompanying music be introduced in VEMUS?

Accompanying music (e.g. piano), is often used in private lessons with a teacher and can prove quite helpful. Indeed studies showed that significant improvement in the ability to perform solo repertoire may come from working with accompaniment.

Personalized learning path tailored to the particular needs of each student.

VEMUS investigates the possibility of personalized remote coaching and monitoring of students' progress alleviating geographical limits and extending the relation of teachers and learners beyond the physical limits and time schedules of the classroom. This way VEMUS seamlessly blends e-learning and innovative technological enhancements with traditional face-to-face lessons to form a complete learning setting. From a different point of view, the system may need to be flexible enough to allow the learner to decide on his/her own about what to study next. The possibility to allow the student to inspect his/her own level and progress may be another available option.

Music classroom settings

How is music teaching organized in the different countries of the Consortium? Is the teaching of an instrument taking place in a one-to-one setting? What kind of classroom settings is needed? How can collaboration in classroom, or between remote classroom sites, involving students, who work and study separately using VEMUS and its distance learning extensions, be achieved?

Explaining hard-to-teach points in practice

How, when and what oral instructions teachers provide during a student performance? A specific part of a musical piece or a certain approach of a musical performance may present difficulties that are hard to explain. VEMUS aims to help music learners to get a fuller understanding of their own performance (and their mistakes) and to better take advantage of VEMUS when practicing alone. Visualizations may support the explanation of hard-to-teach points. Such points may, for example, refer to, (a) onset and duration, (b) pitch, (c) dynamics, (d) timbre.

2.2 Questionnaires and interviews

During the workshops a series of questionnaires (see Appendix A) will be given to the participants and interviews will take place. The main issues under discussion are presented in Table 3:

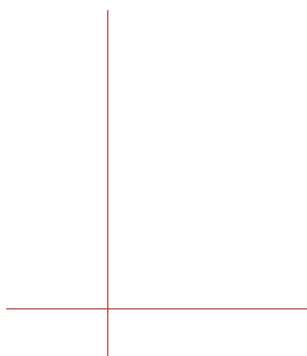


Table 3: Aspects under investigation during the Requirements Elicitation Process

Feedback Practices	What means do teachers of music use give feedback to students while in the classroom? Verbal, visual, metaphorical? How is the feedback communicated to the learner? Is it annotated on the score? When do teachers give feedback? Do they interrupt? Do they wait for the student to complete their performance? Where is the feedback referring to?
Annotation practices	What are the most common elements of music tuition that are commented with annotation? The difference between notation and annotation should be clear.
Teacher -student interaction practices during tuition	How do learner and students interact during music tuition: Do they play together, for example? Possible reasons that interaction is only one way? How do students require the teacher's help? Do teacher's impose a dull way of learning and practicing music? How could this change?
Motivation	How could be students motivated to study more at home? By their teacher's? by their parents?

2.3 Use Cases

The information from the consolidated user feedback will be fused in the use-cases with explicit cross-references from the use-cases to the consolidation of user input. This process justifies the specific features that will be selected for VEMUS and the design choices. During the second cycle of user activities and user input, specific questions are identified that will be included in a specifically prepared questionnaire to be used for obtaining more structured feedback. The use-cases have been used as a means to document the findings of the requirements elicitation procedure, providing a bridge to technical specifications and designs. A use case is a self-contained description of the interaction of the actors (teachers and students) and the system during a well defined activity. Use cases capture and provide a common understanding of the functionality and merits of the envisioned system, to be shared by all people involved in VEMUS including the technical and educational partners, the music teachers and students, the administrators of music schools and conservatories, and so on.

The aim of use cases is to give a meaningful representation of the most important and representative contexts of VEMUS, i.e. the use cases that best capture its most innovative features and most clearly identify its scope. The descriptions of the use cases maintain an intuitive, non-technical style focusing on functionality, interaction and pedagogical considerations rather than implementation and technical details.

Each use case is given a title and its content includes the following paragraphs:

- **Actors & Context**, listing the actors involved in the use case and providing short information on the context of this use case;
- **Summary**, providing a short description of the use case;
- **Description**, which includes a thorough description of the steps in interaction of the involved persons (student/teachers) and the computer(s);
- **Technical Considerations**, which includes mainly considerations of technical challenges and technologies necessary to implement the described scenario at hand; and
- **User-Interface and Functional Specifications**, which discusses user interfacing and other related functional issues. It may include schematics whose purpose is to illustrate and organize the functionalities rather than actually presenting a view of the VEMUS user interface which can be expected to significantly differ from the figures in this text.

3. Evaluation

The following sections present the evaluation plan for the VEMUS system. The aim of the evaluation is to investigate the impact of the VEMUS system on computer-supported music tuition within controlled conditioning. It will apply a consistent quasi-experimental methodology in order to provide coherent and statistically meaningful results that will confirm the strong potential of the VEMUS system as a pedagogically motivated e-learning environment shown already by IMUTUS concept and approach.

The impact of VEMUS on music tuition is addressed in three learning environments:

- (i) a self-practicing environment, equipped with advanced tools and automatic performance evaluation to provide constructive feedback maximizing the effectiveness of practicing,
- (ii) a classroom environment with innovative tools for teaching music in group settings and in the classroom to support collaborative learning and group activities. A classroom setting may be characterized:
 - a. a teacher-student interaction where they are both engaged in a one-to-one tuition
 - b. a teacher interacting with more than one students in a group setting where effectively the teacher-student interaction is formulated as many times as the number of students
 - c. a student-student interaction that is overseen by the teacher

It should be noted that as the VEMUS system cannot support the processing of more than one performance the classroom environment is conceived as a dyadic relation between either a teacher with a student or a student with another student. Such dyadic instances may be repeated without constraints throughout the classroom setting.

- (iii) a distance learning platform that will not only provide a content repository but also communication and progress monitoring tools that will enable it to become a virtual meeting practicing and remote coaching place.

Software development cycles and evaluation

In VEMUS basic research and software development is performed iteratively with evaluation after each stage of development, resulting in prototypes of increasing degree of performance (mock-up at M12, Initial prototype M16, Prototype M24, and Final version M30) . According to this model a linear development is followed: a) user requirement analysis and definition, b) system and software design, c) implementation and unit testing, and finally d) integration and system testing. In order to integrate the evaluation (and validation) periods in this linear development the consortium is planning two phases of evaluation work (Evaluation Period I and II). The purpose of Evaluation Period I is to examine certain functional parameters of the practicing environment in order to fine-tune the behaviour of the modules involved in the performance evaluation. A limited number of students and teachers will participate in Evaluation Period I; students will be asked to express their preferences, while teachers will provide their pedagogical view-point. This phase is necessary in order to assure that the “best” possible system is assessed during the main evaluation in Period II.

The main body of evaluation work is Evaluation Period II. The primary aim of the work at this stage is to assess how well the approaches and designs meet the demands of students and teachers, in particular how the environments offered by VEMUS works in practice and how it is appreciated.

3.1 Evaluation Parameters

New technology has already been integrated into the society to a large extent, and we are frequent users of computers in order to communicate, organize, make presentations, search for information, and store sound and pictures. Some people are amused whereas others are confused by this rapid technological evolution. In education, an area which by tradition has centered around a teacher–student scenario, we are presently facing many basic questions dealing with human-computer interaction. How and to what extent can new technology improve education and learning? What is the obvious and deeper impact of computer-based instruction on the learner's performance? What should be taken into consideration when letting computers provide tuition to young students? What could be expected with regard to user affects and attitudes in handling a computer-based tuition system? The impact of the VEMUS system on the users of these learning environments will be measured based on five parameters:

- I. Musical performance
- II. Music study strategies
- III. Affect and attitude
- IV. Collaboration
- V. Usability

The rationale for suggesting the above parameters lies with the priorities and framework of the VEMUS project, the previous work done with IMUTUS, and up-to-date findings in music education literature.

3.1.1. Musical performance

Preliminary feedback obtained during validation activities in the context of the preceding IMUTUS project, has been very positive and, in some cases, enthusiastic. Objective comparisons of performances on the same music pieces by students that used IMUTUS to those of students that did not, also clearly confirm the positive effect of IMUTUS in helping students improve their musical skills. Adopting and extending the IMUTUS approach, VEMUS can be expected to have a large impact on the student's musical skills. In a recent Swedish research project "Feedback learning of musical expressivity" it was concluded that musicians benefit from computer tuition only when the program supplied enough detailed feedback on their music performances (Juslin, Karlsson, Lindström and Schoonderwaldt, 2005).

3.1.2. Music study strategies

Besides improvement of musical skills, which is the most obvious topic to evaluate for a music tuition system, improvement in strategies and motives during practice will also be investigated as a significant factor of impact on music tuition (Mc Pherson 2005). This is in line with valid research findings on skill acquisition indicating that high achieving players possessed sophisticated strategies for playing their instrument very early in their development. Hallam's (1997) found that practice is most purposeful and self-determined when students acquire a range of task-oriented strategies to draw upon (Hallam 1997; Hallam 2001; Barry and Hallam 2002). Other work by Cantwell and Millard (1994) provides valuable information about 'surface' and 'deep' approaches used by young music learners and suggests that learners should be cued to adopt higher levels of processing after rudimentary skills in playing the instrument have been established. Independently of difficulty level, deep learners displayed greater depth of content concern and greater flexibility in strategy behaviours, while surface learners were consistently data-bound and strategically biased towards both rote learning techniques and recourse to external sources to resolve difficulties (Sullivan and Cantwell 1999; Hallam 2001). Impact on musical learning is thus investigated as result of supporting metacognitive and critical thinking by interactive means of mentoring (Cook 1998; Hallam 2001; Mc Pherson 2005; McPherson 2005) and by shifting the focus to students' freedom to make decisions about their own learning by choosing the appropriate strategies.

3.1.3. Affect and attitude

Obviously, computer experience is not only a requirement on the students but also of great importance for the teachers who want to rely on the computer as a tool for teaching. This means that the teacher's affect and attitudes to new technology is essential for the outcome of computer applications; an affect, an attitude and a sentiment that should be transmitted to the students. The emotion of the user is a critical part in every computer-related or goal-directed activity. Psychology of emotion is a growing field with implication for advances in technology. Many psychologists argue that the emotional system is involved more or less in every thought, action and performance (Picard, 1997). Researchers are making distinctions between emotion, mood and sentiment. Emotion is characterized by its object-directedness (we get sad for something), whereas the moods are characterized by not

being directed at any specific object, and hence, are perceived as diffuse, global and general (e.g. to be depressed in general). Sentiments on the other hand are not states of an individual, but rather the expected emotion relative an object in which the individual has assigned properties. For instance, when a person says she likes Apple computers rather than PC computers, she tacitly expects computer interactions characterised by positive or negative emotions, respectively, like a stereotype. Sentiments may arise from social learning as well as being a more immediate generalization (Frijda, 1994). Young people may be much more inclined to base their sentiment on the description by someone else, or adopt stereotyped sentiments from idols or celebrities, than what could be expected for adults. Student and teacher affects and attitudes towards VEMUS will be assessed and evaluated during the evaluation. Longitudinal measures. Emotions may last for a few seconds, moods may persist for hours and days, whereas sentiments can persist for longer period of time. For this reason, sentiments are of critical importance for human computer interaction because they are able to guide and motivate users in different applications. Since the initial impression of using a new computer software can be expected to be positively coloured, the students' impressions of VEMUS will be examined after each week of the validation period.

3.1.4. Collaboration

The master-pupil model for private study and the rehearsal model for group instruction are the two approaches that dominate the mainstream music education (Bartel 2000). In the master-pupil model the teacher “demonstrates” skills and attitudes and the student is inducted into these through small “assignments” handed out by the master. Students are measured by their ability to create a performance “product,” to meet certain instrumental or vocal criteria established by the teacher. Musicianship skills such as discrimination in listening skills, ability to describe musical forms, and an understanding of history and context are more likely to be induced to students that engage in a teacher-student collaboration. In the rehearsal model, the focus is shifted to processes of musical ensembles and music making aiming to shift the balance of power away from the teacher/conductor toward shared musical experience (Kaschub 1996; Wiggins 2000). Wiggins (2000) sees collaborative work as more powerful for problem solving and decision making than individual work; she makes the point that in group work, students have to advocate for their ideas and defend them, which leads to results that are more carefully thought through. Kaschub (1996) notes that, if musical success is measured solely by performance quality, then the teacher/conductor model is adequate. She proposes an alternative vision of musical success: the students' ability to perform and make musical decisions without the assistance of the teacher. In any case, the purpose of the instructional approach should be to increase the engagement of students in music learning for longer and in a more joyful way and decrease the sentiment of obligation and formality towards music learning and schooling in general. Thus, the effect of collaboration in music learning should be investigated amidst the lines of engagement, enjoyment, proactiveness, and sense of community and sharing of music experiences. Such effect may be favoured when music tuition is associated with real and meaningful musical events, students are seriously involved in repertoire decisions for public performances, and students are helped to identify and communicate problems and solutions to the teacher and the larger group. In both the master-pupil and the group instruction there are very serious elements of collaboration, whether it is between the teacher and the student or between students. In the classroom environment, in particular, it is easier however to let the student build a sense of community and motivate him/her to develop initiative, and let the teacher to effectively participate in the learning process by directing the students in a series of group activities intended to guide the students on an educational. On the other hand, in the teacher-student collaborative model, the learner needs may be more easily accommodated on the level of musicianship skills.

3.1.5. Usability

Usability is the most common term in discussions of human-computer interaction. Löwgren (1993) suggests the real approach to validation of HMI which defines usability as the result of Relevance, Efficiency, Attitude and Learnability. That is, the validation should assess how well the system serves the users needs, how efficient the users can carry out their tasks using the system, the users' subjective feelings towards the system, and finally, how easy the system is to use and learn. Usability is a main topic for the VEMUS evaluation/validation, receiving increasing weight toward the end of the project.

3.2 Evaluation Measures

The evaluation of the VEMUS system based on the five parameters introduced earlier is employing a set of standardized instruments .

3.2.1. Musical performance

The most obvious topic to evaluate for a music tuition system is the students' musical improvement, or in the VEMUS case, how efficient the system is in supporting students to learn to play the instrument. In a recent Swedish research project "Feedback learning of musical expressivity" it was concluded that musicians benefit from computer tuition only when the program supplied enough detailed feedback on their music performances (Juslin, Karlsson, Lindström and Schoonderwaldt, 2005). In the evaluation of IMUTUS, students' improvement in musical skills during the validation period will be assessed quantitatively based on statistics of performance errors (stored in the computer log files), as well as qualitatively based on the teachers' impressions (compiled from questionnaires and interviews). The strategy for the evaluation to collect qualitative and quantitative data as they appear in students' and teachers' self-reports, and combine these data with performance measures from the practising sessions stored in the computer log files.

3.2.2. Music study strategies

Improvement in studying processes or changes in the usual ways of studying is in line with most instructional approaches that advocate that a learner who is aware of good practices in studying and learning and reflects upon their own practice and improvement is more likely to achieve higher learning goals. Thus, investigating the impact of VEMUS environments on music practice would be to examine how the motives and practices of studying music are affected after a short or longer use of the VEMUS system. For example, do students see the music practice at home less of a duty and more of a creative practice after a period of using the VEMUS system?

The Study Process Questionnaire (SPQ) (Biggs 1978; Biggs, Kember et al. 2001; Kember, Biggs et al. 2004) is a widely used measure of learning approach and was proposed to have three orientations: surface (learning approach), deep, and achieving, each with an underlying motive and strategy. Specifically the underlying motive of the surface learning approach may be the fear of failure and a predominant strategy may be learning by rote. We propose that such a questionnaire may be used and appropriately adopted to suit study practices in music learning in order to investigate whether using the VEMUS system over a period of time may shift the student from a surface to a deeper learning approach. The SPQ questionnaire has already been used in music education (Sullivan and Cantwell 1999; Hallam 2001) to identify planning strategies of musicians. The questionnaire includes questions that refer to motives of practice, for example fear of failure, intrinsic interest and achievement. For example (1) surface--meeting the minimum requirements; (2) deep--an intrinsic interest in what is learned; and (3) achieving--enhancing ego and self-esteem through the competition for grades. (See Appendix B)

3.2.3. Affect and attitude

In view of the special concerns regarding the young students none of the ready-made validation tools was, however, considered appropriate. Instead, it was decided to design simplified questionnaires tailored to the actual needs of the project. This has been done by members of the Music Psychology Group, Uppsala University, Sweden. As a result, a properly scaled-down set of questionnaires inspired by the exhaustive set of validation objects, sources, and dimensions included in the ValNet [Valnet], SUMI [SUMI] sources, was obtained (see Appendix B).

The questionnaires are designed to assess overall usability and affect and attitude as defined in the section "Main topics for validation" above. They will contain a mix of fixed response alternatives and open-ended questions. Questionnaires aimed for students are in simple style that avoids abstract and ambiguous terminology and questions. There will be three different kinds of questionnaires (see Appendix). The first will be used to estimate (longitudinal) usability, affect and attitude changes among students during the evaluation period. This questionnaire will be answered at the end of each evaluation week. The second and third questionnaires aim at final evaluation at the end of the period, with reflections on VEMUS as well as previous computer experience. The students and the teachers' answers will be possible to compare in a systematic way.

3.2.4 Collaboration

For the Collaborative aspects of the approach a specific questionnaire has been designed. This is partly a short version of the "Inventory of Competence and Knowledge Sharing" (Hakkarainen Kai et al., 2004). This short version consists of 26 items which refer to six domains (See Appendix B):

- 1) Resource management: Peer learning (Pintrich P.R et al. 1991),
- 2) Experienced knowledge sharing in a class,
- 3) Knowledge building culture,

- 4) School support for knowledge sharing,
- 5) Trust in school, and
- 6) Progressive problem solving.

3.2.5 Usability

Usability issues will be investigated with regards the four VEMUS environments at late studies of valuation so that a usability study is applied on an almost complete system.

	Description	Synopsis	Advantages	Disadvantages
Heuristic Evaluation	HCI experts separately review an interface and categorize and justify problems based on a short set of heuristics (rules of thumb). It can be done using an on-line form (for example one based on Nielsen's Heuristics)	Uses short guidelines No scenarios or tasks Uses experts	Uses experts Gives multiple reviewers common rules to site for justification of reviews Reasonably fast	Teachers of music with significant ICT experience maybe difficult to find and involve
Cognitive Walkthrough	A method which fully utilizes task scenarios to stress the user's cognitive process and model, which guides the analysis.	Uses «information processing perspective» which puts the focus on the user's cognitive process and perception Uses scenarios and tasks	Puts the focus on the user May focus on known problem areas Recognition of user goals	May be tedious Tries to make the designer the user Inherent bias because of task selection Does not cover entire problem space

3.3 Evaluation Design for the Self Practicing and Classroom environment

3.3.1 Evaluation settings

Based on the VEMUS learning environments and platforms we can identify the following settings where we can plan the evaluation of the impact of the VEMUS system on music tuition. These may be better illustrated with the aid of the use cases presented in the Requirements Document.

Table 4: VEMUS settings and use cases

Evaluation (experimental) settings	Use Cases
1. Self-practice setting (SP)	1. Interacting with the score 2. Practice on a score
2. Teacher-student classroom (T-SC) 3. Classroom (CL)	3. Introducing a new song in the classroom 4. Following a student's performance in the classroom (Use cases 1 and 2 are also met here)
4. Distance Learning (DL)	5. Linking two remote music classrooms 6. Twinning remote students

The VEMUS evaluation settings may also be conceived as dependent variables of the instructional intervention, allowing thus a comparison of tuition effectiveness among the evaluation settings as well as a combination of settings in an integral learning experience, for example combining the effect of self-practice with teacher student classroom tuition.

Self Practicing environment

The practising environment in VEMUS is expected to be particularly effective at teaching the more repetitive, yet essential, aspects of learning music. At home, VEMUS can be viewed as playing the role of a “virtual assistant teacher,” offering an inspiring and efficient practising environment during the daily playing sessions. By using VEMUS, the practising work will always be focused on the “weak spots” in the performance, in particular need of practising. Inefficient manners of practising, which unfortunately are too common, are thereby avoided. For example, many students repeat the whole piece over and over again when practising, without reflecting on what went wrong and without focus on the difficult passages.

The basic idea behind the evaluation method is to reach high ecological validity by letting students use the VEMUS system in their homes when practicing on their homework. In this way the student will work with well-defined tasks under familiar conditions. Technical support will be available on the phone from the research leaders when needed. The design is a field trial (Löwgren 1993), in which a limited number of students will be exposed to repeated use of IMUTUS during a period of a couple of weeks. Follow-up questionnaires will be provided each week. This design of the evaluation means that much data will be gathered from each student in a holistic assessment, without trying to average means for statistical purposes, or to maximize the number of participants. There will be two groups of students, one experimental group using VEMUS and a control group doing the same kind and amount of practice, but without access to the software.

Classroom environment

The teachers play an important role for the successful outcome of practicing at home with VEMUS. The teachers have direct control of the educational material, which allow them to introduce their pedagogical expertise into the system. This is primarily done by specific choice of appropriate melodies/exercises, which match the skill level of the student. This is a seemingly natural part of the teachers’ task which, however, requires a substantial experience in order to give a meaningful assignment for homework. Of equal importance are the teachers’ additions of score annotations, by which the teacher guides (a) the student in her playing and (b) the performance evaluation in VEMUS. This is key feature in VEMUS by which the teachers’ partly control the student-VEMUS interaction at home during practicing, without being present. Visible score annotations (such as breathing marks, watch-out icons for accidentals and register changes etc) guide the student in the performance, while invisible annotations controls the focus of the performance validation module (PEM) by indicating difficult passages with regard to e.g. rhythm, intonation or control of air flow.

During lessons homework will be assigned and explained using VEMUS and visible score annotations inserted. More specialised features like the advanced interactivity can be used and explained by the teacher during lessons as well.

Integral environment

Due to the close coupling of the practising environment to normal teaching situation with regular lessons, the evaluation/validation will be integrated in the regular teaching program in music schools as far as possible. A main part of the evaluation of the practising environment will be carried in three Swedish music schools, Nacka Musikskola, Kulturskolan Stockholm and Solna Kulturskola.

3.3.2 Procedure

The students, typically between 9 and 14 years of age, will all be part of a music education program in a music school and attend weekly lessons. They will be distributed in an experimental and control group, respectively, as matched pairs according to their musical skills. The application of matched pairs will make it possible to reach higher statistic significance in the results with less number of students. The assessment of the students’ skill level will be done by their teachers. Typically a teacher will select 2-4 pairs of students each, some pairs at a basic level, and the others at medium and medium+ level. In Sweden, maximum three teachers per instrument are planned to participate. The maximum number of participating students per instrument will be $3 \times 4 \times 2 = 24$. The number of participating students will successively increase from the initial prototype to the final validation.

With five instruments included - clarinet, saxophone, recorder, flute, and trumpet - the number of students involved in the evaluation will be above 100. Possibly, this is a too large number of students to handle in the

evaluation process. If this turns out to be the case, the evaluation will focus on a couple of key instruments of special importance, like the clarinet and flute, and include fewer students for the evaluation of the other instruments. The mock-up version will be tested and evaluated using a couple of students only (without controls) and in the presence of the teachers and the research leaders. Short sessions with the students, separated by a couple of days for development and corrections of the mock-up including tuning of the parameters of the Performance Evaluation Module, will give fast feedback loops in the iteration process towards the initial prototype. One of the students in each pair will use VEMUS and the other will be a control. The VEMUS student will use the system in her/his home for 3-4 weeks per evaluation period. During the first week the experiment leader will be present during a couple of sessions to give instructions and observe the student's interaction with VEMUS. During the following weeks the research leader will visit the student a couple of times and observe how the student's behaviour changes (making annotations afterwards), but otherwise not interfere during the practising sessions. In some cases it will be considered to record the student and the computer screen on video in order to document the student – VEMUS interaction. The research leaders will not keep the teacher informed about the amount of practice sessions at home, the student's way of interacting with VEMUS and her/his interest in the new system, or any changes in error rates as detected by PEM during the period. The students in the control group will record their practising sessions on a minidisk player provided by the experiment leaders. The disks will be analyzed by PEM after the end of the evaluation period in order to enable a comparison with the progress of the VEMUS student. The VEMUS student as well as the control student will receive a small remuneration after the evaluation period of the order of 1 SEK (0.10 euro)/minute practicing time.

The musical material for the evaluation/validation period will consist of the same melodies that the teacher would use as homework for the student in normal teaching during this period. The melodies will be entered into VEMUS music database and the teacher will provide appropriate score annotations. The students in each matched pair will not use the same melodies, with few exceptions.

The VEMUS system will be installed in the students' normal PCs at home. A couple of laptops will be available for those students who need to borrow a sufficiently up-to-date computer. An inexpensive external electret microphone will be used, typically fastened to the screen or to another object about 30 cm in front of the student. As the practising sessions will take place at home the influence of normal everyday sounds (ventilation, kitchen work, brothers and sisters, etc) will be included in the evaluation process.

3.3.3 Evaluation Plan

The duration of the actual evaluation periods/validation will be 3-4 weeks. Before that, one week will be necessary for sessions with the teachers demonstrating the current version of the VEMUS prototype. The Table below shows the arrangement of the validation activities in the foreseen time period.

The Evaluation/validation schedule has taken summer and Christmas holidays into account which otherwise place a natural barrier to the activities.

	Testing & tuning (mock-up)	1 st evaluation (initial prototype)	2 nd evaluation (prototype)
Sessions with teachers	M13-14	M16/w4	M24/w4
Evaluation Week 1	M13-14	M17/w1	M25/w1
Evaluation Week 2	M13-14	M17/w2	M25/w2
Evaluation Week 3	M13-14	M17/w3	M25/w3
Evaluation Week 4	M13-14	M17/w4	M25/w4

The final validation at M31-32 is planned to test the system on 'fresh' students, not previously involved in VEMUS. During a validation period of about the same duration as the evaluation periods (3 - 4 weeks) a representative selection of students from the music schools will be offered to try VEMUS. This group will not involve only students expressing a particular interest for novelties like a computer-based practising system, but also more 'conservative' students who prefer well-known teaching and practicing concepts. In this way, a better estimation

of the impact and usability of VEMUS in general will be attained.

The number of students in the final validation will be determined based on the experience from the evaluation periods. An upper limit of around 5 instruments x 10 students/instrument x 2 students/pair = 100 students seems to be an absolute upper limit. Progress in musical skills and affect and attitude will be assessed in a similar way as during the evaluation periods. The option of including a control group or not in the final validation is a question which cannot be settled before sufficient experience has been gained from the preceding evaluation periods.

3.4 Evaluation Design for the Distance Learning environment

The Distance Learning environment of the VEMUS platform is the most innovative part of the system. For its evaluation a design – based methodology will be adopted that will be based in the implementation in real settings, following a series of specific scenarios of use. Design-based research methods respond to emergent features of the setting. Micro-analyses of learners interactions with activities based on this principle will enable redesign and refinement of the activities and ultimately refinement of the underlying interest-driven learning framework. Thus, emergent behaviours of learners in response to activities drive the development of both intervention and theory, which would have been unimaginable in the absence of real learners' choices. Finally, in a design-based research, practitioners and researchers work together **to produce meaningful change in contexts of practice**. Such collaboration means that goals and design constraints are drawn from both the local context and the researcher's agenda, addressing a concern of many reform efforts (DBRC, 1998). Engaging in such partnerships across multiple settings can uncover relationships between the numerous variables that come into play in learning contexts and help refine the key components of an intervention. In particular, these partnerships can help us distinguish between a "lethal mutation" (Brown & Campione, 1996) -a reinterpretation that no longer captures the pedagogical essence of the innovation- and a productive adaptation -a reinterpretation that preserves this essence, but tailors the activity to the needs and characteristics of particular learning environments-. Sustainable innovation requires understanding how and why an innovation works within a setting over time and across settings (Brown & Campione, 1996), and generating heuristics for those interested in enacting innovations in their own local contexts. In the early stages of the process, **scenarios** will be used in order to plan the methodology and to characterise episodes or a sequence of activities (like in a story). These "stories" will provide the context within which activities will be carried out, so as to give us insights about the needs, difficulties and motivations that users have in particular contexts. Key elements for the VEMUS scenarios of use are the users and their resistance to change, their goals, their needs, the sources of information accessed during the activities, and the information generated by the users themselves. Emergence of a community of inquiry does not happen by itself and does not emerge until considerable group dialogue takes place. Teaching techniques and activities that promote student-student interaction and that focus learning on problem solving and on applications to real-world experience, will enhance the development of such communities. User groups have to develop a frame of reference that allows them to take the new technological applications into account when defining their application requirements. The implementation of pilot scenarios-demonstrations is critical for developing applications that meet core user and community requirements. Defining and implementing an application is a highly interactive process wherein the application helps the user group to understand and appreciate the technology and its potential, leading to a specific scenario of use for the community or user group. **This approach is time-consuming but is essential for effectively introducing new technology-based applications.** In the framework of the VEMUS project an **extended validation process** and a **usability evaluation** will be performed during the development and integration to the final system of the technology, scenario settings and services that will be offered to the users.

The goal is two-fold:

- to specify all the tasks (users' activities within the pilot scenarios) that are relevant to the VEMUS system and to evaluate the users' task on job demands in terms of characteristics and context.
- to mobilise a large group of stake holders to take-up the results and create a sustainable plan for exploit them, and to further explore the potential domains of their application.

Scenarios of Use

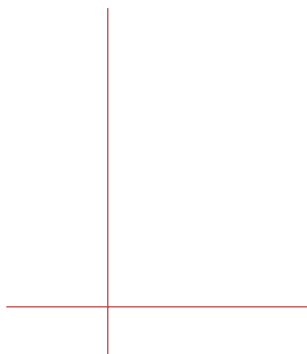
A scenario¹ is a story focused on teachers and learners in a specific context, identifying specific activities which will be followed to achieve certain predefined educational goals. They are written in ordinary language, and would therefore be understandable to various stakeholders involving users (Evans and Taylor 2005). A learning scenario should be flexible enough so as to be creatively reusable, to allow teacher's intervention and be adaptable to changes according to the number of students and classes to which is implemented.

The design of a learning scenario includes the following steps:

- **Short description of the learning scenario:** the general idea of the scenario, the software that is necessary for its implementation, all the additional material and technological tools, the expected pedagogical approaches and learning results, the strategic steps for the implementation of the learning scenarios.
- **Pedagogical, sociological and cultural objectives:** the role of the technological tools that are going to be used in the selected learning scenario, what is innovative in the learning scenario and which is its potential impact upon school community and participants (students, teachers etc).
- **Didactic/ learning procedure:** How students are going to work (alone, in groups) and if or to which extend students could act autonomously.
- **Technological tools:** Description of all the technological tools that will be used for all the activities that the learning scenario includes
- **Instantiation of learning scenarios:** Selection and presentation of some examples of the proposed learning scenario, i.e exercises, assignments to students, which may clarify questions with regards to the use of technological tools or the learning procedure.
- **Implementation to school/music school:**
 - Detailed description of all the phases of the learning scenario in the classroom and in school, taking into consideration all the parameters that could influence its implementation.
 - Expected financial cost for the implementation of the learning scenario.
 - Whether or/and how teachers should be trained so as to implement the learning scenario and ingrate it to their class

In VEMUS, possible scenarios of use concerning the advanced feedback and interactivity features are introduced. Close cooperation with future users i.e. teachers and students is required to explore the questions and problems that arise from these scenarios. An **extended implementation of the specific scenarios** that were developed in the previous stage will be realised. These will be treated as case studies and will be tested in real environments throughout different countries and user groups. At later stages of the implementation the users will be invited to design their own applications and to propose scenarios that meet their needs. This is an essential step in order to estimate the required modifications in the technical infrastructure and in the educational and informational content and methods. **Examples of good practices** will be developed based on the results of the extended implementation and validation phase covering a wide range of applications, from simple training sessions to more advanced learning and teaching scenarios. In that framework, the partnership is planning to include an **extended evaluation regarding the integration of the system and its application in the specific contexts** so as to meet the users' needs.

Questionnaires (pre and post-tests), semi-structured interview guidelines and field observations based on videotaping of the learners activities will be the main evaluation tools for monitoring the evolution of the specific case studies. A series of pilot sites for this evaluation process have been identified in Greece and Romania. These are schools and communities in rural areas that belong to a global network of schools connected over satellite (DVB-RCS) technology to the Internet. As an example the case of Mesta is presented in the following.



Music education through new technologies in a remote rural community: The case of Mesta

Location

The application will take place in Mesta, a small village at the southwest end of the Chios island in the eastern Aegean Sea. Chios is one of the Greek islands lying opposite to the Turkish coast, constituting thus part of EU's borderline to the East.

Background information

Geographical disadvantage and socioeconomic factors have kept the village of Mesta far from many of the influences of modern urban life, as can be clearly seen, for example, in architecture. Mesta is nowadays the only still inhabited well-preserved medieval castle-village in Greece, with a small, but economically active population (around 350 in winter, which surpasses 1000 during a short peak period in August). The rich cultural heritage of the area, with features unique in Greece and the world (medieval architecture, cultivation of mastic, rich traditions, et al.), and its strategic position in the Aegean Archipelago leave ample space for innovative initiatives and rural development, which however are still almost non-existent due to the lack of local social capital. The massive migration and brain drain to the big urban centres of Greece in the last forty years of the twentieth century, as well as an even older and longer wave of emigration to America, have left the formerly flourishing agricultural community with only few permanent residents, mainly middle-aged and elderly, but importantly also some children.



Education in the village

The children of the village, numbering a little more than twenty, used to attend the small multigrade school of Mesta. The function of this school was discontinued in 2002, as a result of a major attempt of the Greek educational authorities to merge small rural school wherever possible, so as to form larger school units in selected rural locations. Since then the children of Mesta have been commuting daily to Pyrgi, a bigger village lying 11 km away, to attend school there. This major change in the life of the village – a traumatic experience for many families– almost coincided with another reform which changed the local administration landscape in the whole of rural Greece. As a result of the centrally decided mergers of village communities into large rural municipalities comprising several villages, Mesta also lost its own local administration and became one of the administrative sections of a new municipality established in Pyrgi.

The local agent

This left the Learning and Culture Association of Mesta, a decades-old local association with rich cultural activity, as the only active local agent that practically promotes lifelong learning for local people of all ages in the village, as well as a number of other initiatives for the revival of the village community and sustainable rural development. It is particularly worth mentioning that for the Association a vision of tremendous symbolic value is to revive the building of the closed school, turning it into an all-day and all-age centre of learning and creativity. With this in mind, it has recently invested much effort and resources for the free provision of evening classes and workshops for children and adults.

Why music education?

ICT skills and music are two of the courses currently running which have attracted considerable interest among the children of the village. In particular there is currently an interest of at least eight children in the wind musical instruments, and predominately the clarinet, the roots of which can be traced in the long tradition of folklore clarinetists in the village. These children, who are at the same time characterised by high levels of self-motivation for mastering ICT skills and the internet –a reaction, apparently, of the youth to the isolation and disadvantage of the village–, are excited by the idea of learning music through new technologies. Besides, applications of learning music at a distance will provide the Learning and Culture Association of Mesta, as organizer of the courses, and the learners themselves with access to resources (including teaching experts) that are impossible to attain and secure in the small scale and isolated position of the village.

Technological infrastructure

The application will be made possible through the broadband satellite link that is currently being installed for the Association in the school building in the framework of the Rural Wings project, an FP6-Aero Integrated Project studying the use of DVB-RCS two-way channels for the provision of broadband applications to remote rural communities. Thus, an infrastructure enabling IP access with 2Mbps downlink and 1Mbps uplink capability will be available for the realisation of the music learning application.

4. Validation

4.1 Aim

The aim of the validation phase is to verify whether the objectives of the VEMUS project are met in a realistic environment of use. Preliminary validation activities carried out by IMUTUS clearly showed a strong potential for the concept and approach. VEMUS will scale-up validation activities to obtain more coherent and statistically meaningful results and to identify the critical factors for wider deployment. The validation activities will start after the final delivery of the VEMUS prototype (including the three different environments) on month 25 of the project's life cycle. For the first period of validation (Month 25 – Month 30) a series of small scale validation activities will be designed and implemented such as validation workshops, info days organised by national authorities or partner institutions in their countries, etwinning activities between schools. For the second period of validation (Month 31-Month 36) a series of wider scale validation activities will be designed and implemented, such as Virtual Music Festivals, Contests for young composers, Music Summer Camp.

4.2 The VALNET Framework

The VALNET framework is adopted in the VEMUS project to guide a reflective process of identifying objects, aspects and resources in validation. VALNET is a high level, guaranteed, homogeneous validation methodology for ICT school pilots, funded by the IST program. It is an accompanying measure to facilitate building knowledge about innovation in schools and creating the conditions for schools of tomorrow. The main objectives of the validation work are a) to adapt a tried and tested methodology to validate the VEMUS environment and b) to implement the validation procedure in situ in a pan-European setting. In the context of VALNET, the methodology was proposed for assessing projects in the School of Tomorrow action line of the 5th Framework Programme. A common issue in European IST projects for schools is the lack of validation across countries and cultures using real-world teaching and learning settings. The partnership will launch a continuous validation activity the VEMUS Users Group. Its aim is to establish, organise and support the global VEMUS community. The members of the VEMUS Users Group will be involved in project's deliverables peer reviews in the framework of a series of validation events designed for the specific purpose. In the framework of the VEMUS project, validation procedures would be based on a strong network of about 100 music schools. This mixed selection will include music schools from Greece, Sweden, Esthonia, Romania and Lithuania. Additionally users from UK, Bulgaria and Austria will be added through the PRELUDE network (Training Network of Music Teachers) which is coordinated by EA. It is also envisaged that the project partners will nominate a selected number of schools to be included in the validation process. EA has already initiate discussions with the European Schools Network (EUN) for the involvement of a small number of schools from the ENIS (European Network of Innovative Schools) network. The proposed network spans many EU member states and comprises highly innovative educational establishments which have been hand-picked by national Ministries of Education for their excellence. These schools have previous experience in testing and validation from the VALNET project, and being "ICT front-runners" they can provide a good test-bed for schools technologies and applications of the future. In this framework workshops, seminars and open days will be organised in music schools in order the VEMUS system and its functionalities to be presented to the users. A full description of the VALNET methodology is available in the deliverable Final VALNET Validation Framework (April 2002) on the VALNET website (<http://valnet.eun.org>). The VALNET framework and tools would be adapted to the settings of the VEMUS project. The VALNET methodology offers a framework for validating technological products for schools so that piloting and field testing results can be collated and analysed systematically and then disseminated widely, thus ensuring rapid impact and widespread uptake.

4.3 Validation of the innovative aspects of VEMUS

Typically ICT in the education and training domain represent a number of inter-related ‘innovation aspects’, reflecting different combinations of

- Technological innovation (using for example new software);
- Institutional innovation (for example new forms of association between the public and the private sector);
- Pedagogical innovation (for example providing self-managed learning outside the conventional teaching environment);
- Economic innovation (reflecting for example, adoption of more cost-effective solutions) and
- Linguistic and cultural (for example develop multicultural software to be tested in different countries).

Therefore it is possible to analyse and read the innovation within the defined ‘evaluation objects’ through five different dimensions such as:

- **Pedagogy (which has been articulated – when relevant – in learning and teaching)**
- **Organisational/institutional**
- **Technological**
- **Economic**
- **Cultural/linguistic**

In the following paragraphs, for each dimension the major processes and areas of innovation are presented and these aspects will be conveyed in the framework of the Validation process of VEMUS project.

Pedagogy

Innovative aspects in Pedagogy: teaching methods, learner grouping, teacher development, curriculum development, timetabling, deployment of teaching and support staff

Pedagogy – Learning

Learning: innovative learning processes, materials and systems; knowledge and skills development, including social and democratic values in the information society, development of higher order skills (autonomy, creativity, team work), assessment (formal and informal learning).

Institutions and policy makers try to implement new techniques and forms of teaching in the school system. Teachers are trained, computers and software are bought, projects on national and international level are initiated and good practices disseminated. It is an effort to establish new pedagogical methods in school in order to improve the capacity and skills of learners (e.g. students, pupils).

Because learners are the ‘clients’ of educational systems, we must not forget their substantial stimulus introduced to eLearning, consequently resulting in:

- Sustainable learner focus (i.e. the paradigm shift from teaching to learning),
- Emancipated learner-teacher relations (i.e. the changing roles of teachers),
- Enhanced learner collaboration (i.e. ‘Communities of Learners’, ‘L2L’),
- Increased integration of new technologies into different subjects,
- Meaningful and targeted use of new technologies in learning at institutional level as well as at home (i.e. from institutional to lifelong learning)

In this respect we can state that the main elements of innovation in VEMUS are related to changes in the methods and tools used for supporting and promoting learning in music, degree of activation of the learners in his/her own learning process, degree of participation of the learners in virtual communities/groups, usage of different typologies of resources/tools for learning inside and outside music school environments.

Pedagogy – Teaching

Teachers not only live in the same rapidly changing world as we all do, they are also called to prepare the generations of the future for this changing world. To put it differently, teachers are not just called to change or adapt their classroom practice, but also to get grips with a culture of change, a culture that requires new learning skills and roles for both teachers and students. This makes teachers' development and changes a very crucial issue. Even more though nowadays teachers face increased intensification of their work, an increased demand for Continuous Professional Development (CPD) as well re-organisation of skills, that often deprives them of essential control and the ability to respond to or initiate change.

Hence it is not astonishing that many teachers fear or reject the use of ICT as part of the teaching and learning in schools. This 'negative' attitude has been often attributed to teachers' conservatism that does not allow them to 'embrace' new practices and roles, that is to change their professional self. It also seems that teachers may feel threatened by the computer because it forces them to organise their classrooms differently, reduces their control and makes their normal approach to monitoring progress difficult to implement. The computer acts as a Trojan horse bringing new ways of doing things into the classroom. Existing routines become problematic because the idea behind the routine, and behind the software, may not be compatible. For this reason, values and pedagogy should be addressed even before the use of technology itself. Teachers are particularly concerned with the educational potential of technology as much as the practicalities of its use. But it is not only 'the teachers'. The key-reason why reform fails to become widespread and sustained is that the infrastructure is weak, unhelpful, or working at cross. Here 'infrastructure' means the next layer above whatever unit is focussed on. In other words, if infrastructure for school change is to be improved, there is a need for development of collaborative cultures at school level, new alliances between communities and schools, improvement in teaching conditions, developing school leaders, policy-coordination at local and national level, support to schools combined with accountability.

Recent research has identified the following stages in teachers' use of ICT, when the development comes to an 'happy-end':

- Entry – that is characterised by frustration and anxiety, replicating traditional instruction and learning activities,
- Adoption – which implies moving from concern with technology to using technology and attention to how they can support established instructional formats and teacher presentations,
- Adaptation – that is greater focus on ways student involvement may change and teaching style may differ, and
- Appropriation – taking the form of new instructional patterns, more reflection on teaching, the need for alternate models of assessment and classroom structuring.

In order to complete these stages successfully, factors playing a significant role in teachers' motivation were found to be the following: having access to a computer outside of school and using many different forms of ICT for their personal use; considering ICT to be highly useful, particularly for their teaching and for their pupils; experiencing few difficulties with using ICT; and having attended useful training courses.

The role of the teacher as an innovation/change agent in school has been underlined by many researchers without ignoring that the task of bringing about genuine change in schools should also involve the community, parents and actors at all levels of the education system. Cautious action and continual reflection are interconnected elements of the change process and changes of attitudes as well as structures are needed on all levels. In other words: the change has to be multidimensional, including change of tools/materials, approaches, and beliefs.

In this respect we can state that the main elements of innovation in VEMUS are related to change of the methods and tools in the teaching process, support to the teachers in organising new daily didactic and in using available resources and tools, new typologies of collaboration between teachers, nature and typologies of activities proposed in the framework of the project through the utilization of the three different VEMUS environments.

Organisational/Institutional

Schools: institutional development and innovation projects, change models, reducing bureaucracy and paperwork, virtual and actual integrated / ubiquitous learning environments, home-school links.

Many changes and innovation trends are going on in the School sector, which are supported or 'pushed' by

National Policies from the National Ministries of Education.

Schools are acquiring more ‘autonomy’ (in the way to organise didactic, in the way to select educational resources and so on) and are supported from financial point of view in introducing ICT.

It goes without saying that, the more the innovation (in any form is considered) is promoted at institutional and organisational level the easier its legitimisation become in the educational context. Nevertheless, the innovation in schools can take place only if, in this process, all the different actors (e.g. headmaster, teachers, pupils) are correctly involved and prepared for it.

The motivation to change (e.g. practice, working process, ‘vision’) has to be supported, encouraged and improved.

In this picture, we do not have to forget that from the rapid evolution of the external environment schools are also called to answer to new emerging needs such as:

- The increase of the culture/education demand by different target groups (Life-long Learning [LLL]);
- The labour market requires skilled people;
- The quality and the ways of learning outside the school are increased;
- The shift of the attention from the teaching to the learning process.

The above elements are bringing some new implications at many different levels from the pedagogical to the organisational one. More and more, schools are looking for new educational resources, which can meet their specific needs (flexible), and for tailored/personalised services. At the same time, through Internet schools can open their ‘boundaries’ and they can be part of a network and form a virtual community in which they can exchange experiences, good practice and find common solution. In this scenario, schools have to be considered as a ‘client’ of the market, and they can be approached and they can establish collaboration with different providers of services and products (commercial and educational ones).

The introduction of innovation in schools and in music schools, if properly carried out, implies changes in:

- The roles and responsibility of the personnel;
- The way to use the space and the equipment within the schools;
- The way to organise lessons and daily didactic;
- The way to carry out training of teachers.

In addition we can underline that the main elements of innovation of VEMUS are related to new teachers’ role and profile, presence of actions for managing and sharing acquired knowledge, presence of new collaborative working and management procedures, planning for a coherent and functional implementation and usage of resources/tools, presence of systems based on client/customer satisfaction and development of new networks and collaboration practices. It has to be noted that the VEMUS approach is expected to have impact in both music lessons at schools in the framework of the normal school curriculum as well as music schools that are following a specific curriculum to prepare their students.

Technology

Technology: *communications, intranet, school on-line presence, mobile and wireless devices, effectiveness of broadband technologies.*

A substantial part of European educational institutions still suffer from limited access to technology in the form of infrastructure, hardware- and software. Similar comments apply to the training of teachers and local ICT responsible. Impact on these conditions are thus still very relevant and should be considered as part of an assessment of technological innovation, even though the idea as such is not highly innovative.

Other aspects of technological innovation include: use of existing technology in innovative ways; testing and/or use of emerging technologies; collaboration with e.g. industry actors or other technology developing actors; technology assisted production and maintenance of educational material; promotion of regional/national/international collaborations by technology; use of technology to perform experiments and/or data collection

otherwise not (easily) feasible; promotion of school/home relations via technology; increased interplay between technology used at home/in society and that used in school; awareness of current technology trends; improving usability of known types of tools.

The application of new technologies to the education and training system is expected to produce a deep impact over the whole market organisation.

In addition we can underline that the main elements of innovation of VEMUS are related to the use of technological tools in every day practice, the utilization of broadband networks for the distance learning VEMUS environment as well as the technological issues for the etwinning of the music schools in the framework of the project. The main issue is how easy (or not) the music schools will adopt the use of the VEMUS environments to their curriculum activities.

Economic

Economic: cost-effectiveness, impact measurement, return on investment, financial models, innovative services, e-commerce for education, funding models (e.g. leasing, outsourcing)

The development of innovative educational products, tools and services is crucial for the European society and their related economic activities. At the same time the rapidly emerging infra-structural possibilities of the www form one of the major driving forces of the innovative European service market. To develop mature and sustainable products, tools and services in the educational sector and to compete in the market, public and/or private European investors have an extensive need to validate their products, tools and services in 'real' conditions in terms of content, pedagogical and technological quality, cost-effectiveness, return-on-investment and impact in order to justify their investments. At the same time investors are facing the challenge to explore:

- Shifting focus from products to customers ('consumer-centred-approach', 'reversal-of-the-value-chain');
- Shifting focus from stand-alone products to 'one-stop-shop' educational resource, service, support and management offers;
- Decreasing lifecycle of educational tools and services;
- Merging markets (i.e. institutional, corporate, home)
- Quality and branding of educational tools and services as key assets in competition;
- New financial and funding models (i.e. leasing, out-sourcing, new strategic alliances, Public-Private-Partnerships [PPP]);
- Re-engineering of logistics, distribution channels due to need for bespoke tools and services;
- Competition between non-commercial and commercial educational tools and services;
- Introduction of e-commerce to educational markets.

Taking furthermore the shift from 'teaching to learning' and the complementary move from 'closed institutional to Lifelong Learning [LLL]' into account, learners will act with greater autonomy and will play a decisive role in steering the learning process at school, at the workplace and at home. Hence personalised, self-assembled as well as on-line collaborative, communicative and networking educational tools and services for emerging 'Communities of Learners' will become the state-of-the-art in Education and Training (E&T). As a consequence a central information source for investors will accumulate knowledge about innovation in institutional settings as well as in corporate and informal environments. Related to those changing paradigms are changing roles of the learners, who become 'clients' of educational systems and markets. To address those clients in a targeted and cost-effective way, investors need to get especially a better insight in their expectations and alterable purchasing and buying patterns.

In addition we can underline that the main elements of innovation of VEMUS are related to : presence of a system for cost control/monitor and optimisation of financial procedures, and a strategy on the use of resource at large scale, presence of innovative models of IPR management.

Cultural/Linguistic

All persons experienced in the evaluation of learning resources are quite aware of the importance of the linguistic and cultural dimension. First we have to see: there is a reasonable overlap between the cultural and the linguistic dimension. Nevertheless we find important differences. The linguistic dimension is obviously the broader one, because it contains in most cases more than one learning and educational culture and can - especially in areas of frequently used languages - contain educational cultures of substantial difference (e. g. the US vs. the UK

educational culture - as far as they can be regarded as homogeneous cultures and have not to be subdivided into subcultures like in the UK example Scotland and its particularities). Different terminologies within one linguistic area constituting important differences within that region can also be found (e. g. quite different educational terminologies in Germany and the German speaking part of Switzerland). A 'pure' translation into another language (if such a thing exists ever) therefore is not sufficient. Language adaptation always has to include the whole area of a cultural 'localisation', even if this concentrates on a 'main educational culture' within a language area, not caring about (regional or sectoral or institutional) sub-regionalisation.

As learning and the institutional educational systems are so deeply influenced by its linguistic and cultural environment they are created and used, in these influences and the obvious differences between learning resources originated in different linguistic/cultural environments dominate our impression. Nevertheless the particularities and differences are only one side of the coin. The other side are the commonalities across cultural and linguistic areas, mostly based on historic (and therefore deeply founded) and important common elements and structures in our learning culture. This 'coexistence' of differences and commonalities form the basic rationale when considering to transfer learning resources from one linguistic and cultural environment into (one ore many) others. Such a transition process (what we usually understand by 'localisation') can only be described completely, if we are able to indicate the linguistic/cultural differences and at the same time the respective commonalities. Such a detailed identification is also a prerequisite, when defining an appropriate evaluation process to accompany a respective 'localisation' and its results.

Such a list of differences and commonalities alone is not yet sufficient. Beyond we need an explicit process to define, which of the differences and particularities should be completely adapted to the targeted linguistic/cultural environment and by this process functionally 'eliminated' (means eliminating all aspects, which would characterise its linguistic/cultural origin) and which particularities of the linguistic/cultural environment of its origin promise an enrichment and value added, when transferred in an appropriate way to a different linguistic and cultural environment. By such a planed influence from other educational cultures we actualise the potential to enrich the target culture by those elements of 'educational 'multi-culturality'.

The VALNET evaluation framework offers the tools to identify the dimensions discussed above means the differences and commonalities and the objectives, which of these differences to eliminate by the localisation process and which of them to keep with the aim to add multi-cultural educational value. It also offers tools to identify, to which extend these different goals are achieved in practice (and in addition in the best case, to which extend these two effects of adapting to and influencing from outside had been successfully combined and balanced). By this, **the linguistic/cultural dimension of the VALNET framework contributes to a better insight into the core area of transnationality of educational resources.**

In this respect we can state that the main elements of innovation of VEMUS are related to presence of a linguistic and cultural policy, activation of trasnational users groups, adoption of trasnational linguistic approaches for fostering transferability of services, products, approaches and good practices.

In the following Tables an initial analysis of the innovative aspects of VEMUS is presented, adopted to the VALNET validation approach. For each aspect a series of validation criteria are presented as well as the data sources that will be used during the validation phase of the project. The data will be collected in the framework of the validation events that will be designed for this purpose.

Pedagogy		Organisation / Institutional			Technology		Economic		Cultural / linguistic		
Learning		Teaching									
- Degree of pedagogical innovation allowed by the VEMUS platform - Degree of activation of the learners as an active participant of the learning process and a member of a community/group		- Degree of innovation in the learning process of teachers - Change of teaching practice with the use of ICT in music lessons - Degree of innovation in use of ICT facilities for professional development - Degree of support to teachers		Coherence between the approach adopted in the use of tools and resources and the innovation on-going processes within the music school		- Usage of resources/tools which are upgraded and transportable (absence of special or non-standard devices that could limit the use of learning materials) and easy to be used - Presence of a strategy for upgrading products and resources		- Presence of a strategy on the use of resource at different environments and at large scale ('scalability approach') - Presence of innovative models of IPR management		Presence of a strategy for using products in different countries	

In the following pages the innovation aspects of VEMUS are explored following the sequence of analysis dimension presented above (e.g. pedagogy first, cultural/Linguistic last)

Detailed Matrix on INNOVATIVE ASPECTS

Innovation aspect		Sub-Aspects	Evaluation criteria	Data to be collected	Data Source
Pedagogy - Learning	Degree of pedagogical innovation allowed by the VEMUS platform		- Flexibility and user customisation - Modularisation - User-friendliness - Reliability - Mode of assimilation - Coherence with the different learning styles	- Percentage and Typology of activities done by the use of ICT - Use of ICT learning material	Persons: - Students - Teachers
	Degree of activation of the learners as an active participant of the learning process and a member of a community/group		Learner interaction	- Number of accesses/amount of time - Time spent in collaborative learning activities - Variety of projects, peer learners, teachers	Persons: - Students - Teachers
	Degree of innovation in the learning process of teachers		- Coherence with the needs and characteristics of teachers - Teacher's satisfaction - Recognition of different backgrounds and previous knowledge	- Methods and tools used - Typologies of activities	Persons: - Teachers - Music school Management
Pedagogy - Teaching					

Pedagogy – Teaching (cont.)	Innovation aspect	Sub-Aspects	Evaluation criteria	Data to be collected	Data Source
	Change of teaching practice with the use of ICT in music lessons		• User friendliness • Flexibility • Coherence with different learning styles	• Development of new assessment strategies and tools • Implementation of new assessment strategies and tools co-ordinated by the teacher • Self-learning activities co-ordinated by the teacher	Persons: • Teachers • Music school Management
	Degree of innovation in use of ICT facilities for professional development	• Teachers' motivation to use ICT for professional development	• Effectiveness and quality according to the methodological framework	• Number of teachers willing to use ICT for professional development • Number of teachers rewarded for using ICT for professional development	Persons: • Teachers • Platform developers • Music school Management
	Degree of support to teachers	• Presence of guidelines to support teachers in using resources and in managing new didactic methods	• Coherence and user-friendliness • Presence of a context-based approach and activities	• Number of teachers using guidelines • Typologies of activities and time spent for applying	Persons: • Teachers • Platform developers Documentation: • Guidelines (on-line and conventional)
Organisational/ institutional	Coherence between the approach adopted in the use of tools and resources and the on-going processes within the music school		• Scalability of tools and resources • Accessibility for different levels of use • Presence of a strategic plan for using the VEMUS platform	• Number of institutions using the resources at the different phases • Reports and information	Persons: • Music school Management

Innovation aspect		Sub-Aspects	Evaluation criteria	Data to be collected	Data Source
Technology	Usage of resources/tools which are upgraded, transportable (absence of special or non-standard devices that could limit the use of learning materials) and easy to be used		- Flexibility concerning compatibility with different platforms and devices - Flexibility concerning both synchronous and asynchronous updating - Flexibility concerning accessibility for disabled	- Suppliers/providers of educational software - Sources of information for schools and teachers about multimedia educational software and learning management systems/evaluation reports while decision making - Types of license agreements	Persons: - Platform developers - Music school Management - Decision makers Documentation: - Technological Reports of VEMUS
	Presence of a strategy for upgrading products and resources	Harmonisation of trans-national standards	- Presence of a national agreed standard - Presence of an international agreed standard	Type of standards	Persons: - Platform developers - Music school Management - Decision makers
Economic	Presence of a strategy on the use of resources at large scale ('scalability approach')		Presence of a strategy for change in scale	Type of standards	Persons: - Platform developers - Music school Management Documentation: - Exploitation plan of VEMUS
	Presence of innovative models of IPR management		Presence of agreements	Type of agreements	Persons: - Platform developers - Music school Management Documentation: - Exploitation plan of VEMUS

Innovation aspect		Sub-Aspects	Evaluation criteria	Data to be collected	Data Source
Cultural/linguistic	Presence of a strategy for using products in different countries	• Harmonisation of trans-national standards	• Presence of a national agreed standard • Presence of an international agreed standard	• Type of standards and agreements used	Persons: • Teachers • Students • Platform developers • Music school Management • Decision makers

4.4 Measures

Evaluation criteria that correspond to specific point of views (e.g. pedagogy- teaching) should be operationalised (e.g. user friendliness – easy to use, easy to learn, need to learn a lot before using the system etc). Results on the object of the validation will be collected through specific tools, questionnaires, structured or semi structured interviews, field observations (through analysis of video captures) log files and web statistics (tracking of users path while using the applications) (see Appendix C).

At this point, and by the time of the validation taking place, it should be noted in this section what is already been achieved with regards fulfilling the scope of the VEMUS project, in the user requirement and evaluation phases employing the milestones as a point of reference. Problems or merits from the evaluation phases should be taken into account in the validation phase. For example, do users identify similar problems or merits in less controlled environments and when involved in the activities for longer periods of time?

4.5 Expected Achievements/Impact

Using music as the main vehicle and engaging groups in different countries and diverse contexts, VEMUS seeks to reach people from different backgrounds and cultures, creating cultural links and ensuring a larger sharing of knowledge and research results and a larger impact. VEMUS will scale-up validation activities to obtain more coherent and statistically meaningful results and to identify the critical factors for wider deployment.

4.6 Proposed Validation Activities

A long series of different validation activities are proposed in the framework of VEMUS project. The proposed activities are aiming at assessing the integrated VEMUS system at real environments. Additionally the validation events include different use cases. The reason is to give the opportunity to the users to asses the different functionalities of the system, used in different conditions. The participants are people who have never use the system before so their assessment is not biased. This group will not involve only users expressing a particular interest for novelties like a computer-based practising system, but also more ‘conservative’ students who prefer well-known teaching and practicing concepts. In this way, a better estimation of the impact and usability of VEMUS in general will be attained. The validation process includes two phases, a first validation cycle where a series of small scale events will be implemented in different countries and settings and a second cycle of wider scale events.

For each of the proposed validation activity the following aspects have to be taken into account and discussed in detail before the implementation of the event.

Identify user groups and users’ tasks on job: The key element is to focus on those groups and to the relevant activities which the platform is ready to support (according to the evaluation phase) and through which the added value of the system could be proven. The activities have to be designed in such a way that the use of the system will be introduced in a smooth and friendly way.

Identify the setting the Validation activity: It is important to describe in detail the setting in which the validation activity will take place. Will this be in a number of focus groups, for instance, or in a laboratory, or in semi- or totally natural environments? Where will the users be recruited from? What tasks will be carried out by the users?

Important Note: The Context of Use should always be used as a guide to ensure that users, tasks, and environments in the validations always accord with the intended final realities, and are not ‘pretend’ or ‘simulated’ scenarios of doubtful commercial value.

4.7 Small Scale Validation Events (Month 24 – Month 30)

Validation Workshops in the Participating countries

Workshops will be used as a key instrument for open consultation and direct feedback from the actors of the music education sector for validation purposes. Workshops will also provide a chance for an actual physical get-together of students and teachers from different countries that will bring out the human side in the wider context of e-learning and virtual support. Moreover, the workshops will provide a chance for e-twinning students to meet in person and to present the results of their collaborative work in specially designed events.

eTwinning between music schools

VEMUS will explore, develop, and evaluate the technological and pedagogical base for etwinning in music, based on student collaborative projects. Students will be able to select a mate from another user-group and collaboratively undertake specific projects and activities using the VEMUS environment. Working together and communicating on a specific subject, students can get to know not only music from other countries but also each other's life style and culture much better. VEMUS will seek to establish connection and benefit from the infrastructure being developed in the context of EC's etwinning programme (www.etwinning.net), taking advantage of its resources and services such as the platform, pedagogical enhancements, technical infrastructure, and support services, but also providing feedback on its results, outcomes and case studies, and disseminating knowledge developed in the context of the project. In this framework the project consortium will disseminate the idea of the VEMUS to relevant websites and events (e.g. etwinning Awards, validation workshops) and will enforce synergies between schools involved in the project and additional schools at the first level, aiming to create new VEMUS music schools pairs at a latter stage. A series of etwinning projects will be designed and prepared to support these activities. These projects will focus on a certain theme developed by teachers in two conventional or music schools. The objectives of the activity will be described in detail. The organisation of a common Christmas music event could be an example of such an activity. Students will have to work together and communicate for the preparation of the event. Special effort will be given to the involvement and participation of rural schools in the proposed activities in order the added value of the distance learning application of the VEMUS platform to be demonstrated (see as an example the "Case of Mesta" which will be used as a demonstrator in this framework).

4.8 Large Scale Validation Events (Month 30 – Month 36)

Launching the VEMUS Users Group

The partnership will launch a continuous validation activity the VEMUS Users Group. Its aim is to establish, organize and support the global VEMUS community. The members of the VEMUS Users Group will be involved in project's deliverables peer reviews in the framework of a series of validation events designed for the specific purpose. In the framework of the VEMUS project, validation procedures would be based on a strong network of about 100 music schools. This mixed selection will include music schools from Greece, Sweden, Estonia, Romania and Lithuania. Additionally users from UK, Bulgaria and Austria will be added through the PRELUDE network (Training Network of Music Teachers) which is coordinated by EA. It is also envisaged that the project partners will nominate a selected number of schools to be included in the validation process. EA has already initiate discussions with the European Schools Network (EUN) for the involvement of a small number of schools from the ENIS (European Network of Innovative Schools) network. The proposed network spans many EU member states and comprises highly innovative educational establishments which have been hand-picked by national Ministries of Education for their excellence. These schools have previous experience in testing and validation from the VALNET project, and being "ICT front-runners" they can provide a good test-bed for schools technologies and applications of the future. In this framework workshops, seminars and open days will be organised in music schools in order the VEMUS system and its functionalities to be presented to the users.

VEMUS Festivals

Another large scale Validation event could be the organization of a VEMUS festival (see an example of a VEMUS weekend in the following session). This kind of event could be the concluding event of a series of implementation of validation activities as the organization of etwinning projects between music schools. Teachers and students who have participated to a series of such activities will have the opportunity to present their work to the wider VEMUS community in such an occasion. Teachers and students will participate in such an activity and they will have the chance to discuss with the VEMUS consortium members as well as with experts in the field in order to explore in detail the utilities and functionalities of the VEMUS platform. Special care will be given to the preparation of such event in order to integrate all the necessary aspects that have been identified during the

evaluation process. Based on them the framework can demonstrate, where on its specific way through the process a case can benefit from the information available while assessing the different aspects of innovation. This selection of cases of relevance for practical demand on evaluation show us that 'single destinations' only cover part of them. We also will be confronted with cases with 'multi destinations', e. g. a validation aiming to assess the suitability of a product for different cultural/linguistic areas. Therefore the framework has to prove also its usability for 'multi-destination- validation' or 'roundtrip validation'.

VEMUS on-line European Music Contest

An additional and possibly less expensive validation activity could be the organization of an on-line Music Contest at European level. EA has great experience in the organization of such events that have been very successfully implemented in the framework of other projects (e.g. European Science Contest, www.connect-project.net, European Astronomy Contest in collaboration with EUN (European School Network) and EPS (European Physical Society), www.skywatch.org). In the framework of this event the participants will have to work over the web to prepare their work. Again they will get familiar with the utilities and the functionalities of the VEMUS application. A committee of experts will be assigned with the task to evaluate the best pieces of work and declare the final winners. The process of collecting data will be more demanding in this case as the number of participants who are finally submitting the relevant validation forms (which are also on-line) is smaller in comparison with similar occasions of conventional events. Still the platform is giving the opportunity for the collection of web statistics and log files that would be an excellent source of information of the use of the system.

VEMUS Summer Camp.

A promotional event, where more active contributors and winners of events will come together enjoy the music with musicians. Media is invited to take part and some famous musicians are invited and paid too to make workshop. Summer camp will be held in one beautiful place and participants are invited from different schools. Not just from Estonia, but from other Baltic countries as well.

EXAMPLE OF PROPOSED ACTIVITY

Validation Activity

VEMUS Music weekend

Context: The EA conservatory**Participants:** Students, Teachers, Parents, Experts**Summary:** Students from national and international music schools are invited to a two-day music contest for students.

VEMUS 'studios'	1. Three teaching rooms are turned into VEMUS 'studios' where students can play with the VEMUS system (as it is described to the Interact with a score and Practice on a score use cases) while a teacher/expert from the VEMUS team is available for guiding the student through the VEMUS interface and the available functions. Students can take turns of 15 minutes in the VEMUS studios.
VEMUS 'classroom'	2. The students that are interested to carry on their practice and to get familiar with advanced features of VEMUS may continue in the VEMUS classroom, a PC room that can accommodate 10 students to practice with VEMUS wearing headphones. A teacher-helper (music teacher expert in VEMUS) is again available in the VEMUS classroom. At given times the teacher may run a group activity such as use case of introducing a new song in the classroom . The other students in the classroom follow the teacher's (or a student's who offers to demonstrate) performance in the classroom . After practicing in the VEMUS classroom on their own and wearing headphones, the students can go back to the VEMUS studio to record their best performance. Those who do can take part in the end-of-the day contest.
10 performances enter the 1st round end-of-the day- contest	Then the 10 best performances are presented, based on the PEM results (Performance Evaluation Model) in a open session (accommodated in the VEMUS classroom) where everybody is invited. All students, teachers and other participants of the music weekend can become judges. All the 10 recoded performances can be visualised with the help of the advanced off-line feedback utility of the VEMUS platform. The performances are played back one by one and are superimposed to a model performance . While the performances are played back and the graphic visualisations are illustrated, the judges can vote in order to find the 10 best performances. The judges and audience follow the performances through computer screens and a data projector, as if they would follow a student's performance in the classroom.
And the winner is...	The 10 contestants return to the VEMUS studios to record 10 new performances. The 10 contestants return in the VEMUS classroom. The students are asked to edit the performances with visualisations, annotations, and emoticons. A discussion follows with regards the criteria for naming the best performance. The three best performances, based on PEM, are awarded with the Music Weekend prize. In the end of the second day the winners may perform live in front of the audience with a VEMUS accompaniment.

Aspects to be validated

Technical Support Issues (problems, key needs, suggestions, etc)

Conditions of use (PC lab? how many students per PC? technical approach for collaboration)

Training issues

Costs and benefits

Validation Feedback from

Teachers

Students

Educational establishments

A. Appendix for 'User Requirements'

A1. Questionnaire (in Greek) distributed to the Greek teachers after the 1st workshop with informal translation for reference purposes .

Αγαπητοί καθηγητές

Τα στοιχεία σας και οι απαντήσεις σε αυτό το ερωτηματολόγιο είναι εμπιστευτικά. Θεωρούμε ότι η βοήθειά σας είναι πάρα πολύ σημαντική στο σχεδιασμό και αξιοποίηση του προγράμματος VEMUS. Σας ευχαριστούμε θερμά για την συμβολή σας στο πρόγραμμα.

(Dear Teachers

Your name, data and answers to this questionnaire are confidential. We consider your help as very important for the design and evaluation of the VEMUS project. We kindly thank you for your contribution)

Εκ μέρους του προγράμματος VEMUS

(On behalf of the VEMUS project)



Ελληνογερμανική Αγωγή Τμήμα έρευνας και
ανάπτυξης



Ωδείο Φίλιππος Νάκας



Ινστιτούτο Επεξεργασίας Λόγου

Το προφίλ σας (Your profile)

1. Πόσο συχνά χρησιμοποιείτε υπολογιστή στη δουλειά σας; (how often you use computer at your work?)

Κάθε μέρα

Αρκετές
φορές τη
βδομάδαΜια φορά τη
βδομάδαΜια φορά
στις 15 μέρεςΜια φορά
τον μήνα

Συχνά



Ποτέ



2. Πώς θα περιγράφατε τον εαυτό σας σε σχέση με τη χρήση υπολογιστών; (How would you describe yourself with regards to the use of PCs?)

Καθόλου έμπειρο



Μάλλον έμπειρο



Πολύ έμπειρο



3. Έχετε προηγούμενη εμπειρία με χρήση υπολογιστών στη διδασκαλία της μουσικής; (Do you have previous experience with the use of computer in teaching music?)

Καθόλου εμπειρία



Λίγη εμπειρία



Αρκετή εμπειρία



Πολλή εμπειρία



4. Ποια είναι η στάση σας σχετικά με την χρήση υπολογιστών στην διδασκαλία της μουσικής; (What is your stance towards the use of PCs in teaching music?)

.....

.....

.....

5. Έχετε χρησιμοποιήσει κάποιο πρόγραμμα υπολογιστή για να υποστηρίξετε τη διδασκαλία σας; (Have you already used a computer programme to support your teaching?)

Ναι



Όχι



Αν ναι, περιγράψτε το είδος της εφαρμογής που χρησιμοποιήσατε και κατά πόσο μείνατε ικανοποιημένοι από την εμπειρία αυτή. (If yes describe the type of application and how satisfied you were from this experience?).

.....

.....

.....

6. Έχετε χρησιμοποιήσει συστήματα τηλε-διδασκαλίας με την ιδιότητα του καθηγητή; (Have you already used as a teacher distance learning systems?)

Ναι



Όχι



Αν ναι, περιγράψτε το είδος της εφαρμογής που χρησιμοποιήσατε και κατά πόσο μείνατε ικανοποιημένοι από την εμπειρία αυτή. (If yes describe the type of application and how satisfied you were from that experience)

.....

.....

.....

Παιδαγωγικές απαιτήσεις (Pedagogical needs)

1. Κατά τη γνώμη σας, τι είδους πληροφορίες και βοηθήματα χρειάζεται ο μαθητής στη διάρκεια της μελέτης του; (What kind of information does a student need during their music practice at home?)

.....

.....

.....

.....

2. Κατά τη γνώμη σας, τι είδους πληροφορίες πρέπει να ανταλλάσσονται μεταξύ του σπουδαστή και του επιβλέποντος καθηγητή (What kind of information do you think they should be exchanged between student and teacher);

Πληροφορίες (βαθμολογήστε από 1=ασήμαντο έως 5=πολύ σημαντικό)	1	2	3	4	5
Να στέλνει ο μαθητής στον καθηγητή ηχογραφημένο αρχείο με την εκτέλεση του (the student should send to the teacher an audio file of his performance)	☐	☐	☐	☐	☐
Να στέλνει ο μαθητής στον καθηγητή βίντεο με την εκτέλεση του (ώστε να μπορεί ο καθηγητής να εξετάζει την στάση, τον δακτυλισμό, κ.λπ.) (the student should send to the teacher video file of his performance)	☐	☐	☐	☐	☐
Να μπορούν να ανταλλάσσονται απορίες και απαντήσεις (Questions and answers should be exchanged)	☐	☐	☐	☐	☐
Να στέλνει ο καθηγητής στον μαθητή συμβουλές και υποδείξεις για την συνέχιση της εξάσκησης (advice and suggestion for continuing practicing)	☐	☐	☐	☐	☐
Να μπορούν να ανταλλάσσουν γραπτά μηνύματα σε πραγματικό χρόνο (written messages in real time)	☐	☐	☐	☐	☐
Να μπορούν να ανταλλάσσουν ηχογραφημένα μηνύματα (audio messages should be exchanged)	☐	☐	☐	☐	☐
Να μπορεί ο καθηγητής να προσθέτει σημειώσεις πάνω στην παρτιτούρα και να τις στέλνει ηλεκτρονικά στον μαθητή (the teacher should be able to add score annotations and send them via e-mail to the student)	☐	☐	☐	☐	☐
Να στέλνει ο καθηγητής στον μαθητή ηχογραφημένα αρχεία με υποδειγματικές εκτελέσεις κομματιών (the teacher to send to the student audio files with exemplary performances)	☐	☐	☐	☐	☐
Άλλο: (other)	☐	☐	☐	☐	☐

Το σύστημα IMUTUS (The IMUTUS system)

1. Ποιες προσδοκίες είχατε όταν ακούσατε για το IMUTUS για πρώτη φορά (στη διάρκεια της εισαγωγική παρουσίασης του workshop ή σε προηγούμενη σχετική συζήτηση); Εξηγήστε με δικά σας λόγια τις πρώτες εντυπώσεις και σκέψεις που είχατε.

What were your expectations when you first heard about IMUTUS (during the introduction of IMUSTUS and the following workshop. Explain in your own words impressions and thoughts)

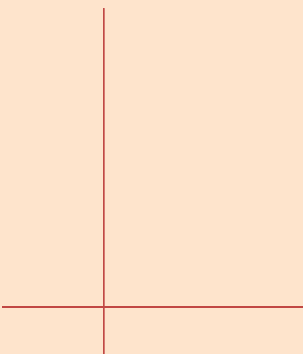
.....
.....
.....

2. Ποια από τα χαρακτηριστικά του συστήματος IMUTUS θεωρείτε πολύ καλά ή πολύ άσχημα από παιδαγωγικής πλευράς; (Which IMUTUS features you consider as very good or very bad from a pedagogical point of view)

.....
.....

Προσωπικές πληροφορίες
(Personal Info)

Όνοματεπώνυμο:	_____
e-mail:	_____
Ποιο μουσικό όργανο διδάσκετε; (Instrument you teach)	_____
Έτη διδασκαλίας: (Years of experience)	_____



A.2 Questionnaire (in Greek) distributed to the Greek teachers after during the 2nd cycle of user requirements

The document that follows in Greek is a free translation of the consolidated user feedback document and includes issues that emerged during the first 4 workshops of the user requirements phases. Greek teachers were asked to reply in written to the questions and issues raised in this document.

Θέματα σχεδιασμού στο Πρόγραμμα VEMUS

Ερωτήσεις προς τους Έλληνες δασκάλους μουσικής

Προς τους Έλληνες δασκάλους που συνεργάζονται για το σχεδιασμό του προγράμματος VEMUS

Το παρακάτω κείμενο είναι μια περίληψη των παρατηρήσεων που συγκεντρώθηκαν από εσάς και τους συναδέλφους σας στις άλλες χώρες που συνεργάζονται για το VEMUS.

Παρακαλούμε θερμά να το μελετήσετε και να απαντήσετε στις ερωτήσεις που τίθενται, όπως επίσης και να συμπληρώσετε τυχόν άλλες παρατηρήσεις που πιστεύετε ότι θα είναι χρήσιμες για το σχεδιασμό του προγράμματος. Απαντήστε χωριστά σημειώνοντας την αξιόμηση των ερωτήσεων.

Ευχαριστούμε

Ελληνογερμανική Αγωγή
Ωδείο Φίλιππος Νάκας

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Εισαγωγικά

Το VEMUS (Virtual European Music School - <http://www.vemus.org/>) προορίζεται για παιδιά που μαθαίνουν κάποιο μουσικό όργανο αλλά και για ενήλικες που έχουν κάποιες μουσικές γνώσεις αλλά χρειάζονται κάποια μέθοδο εξάσκησης στο όργανο. Το VEMUS στοχεύει στην δημιουργία μιας ανοικτής, διαδικτυωμένης, και πολύγλωσσης πλατφόρμας για εξάσκηση σε μουσικά πνευστά όργανα, η οποία προτείνεται ως συμπλήρωμα των παραδοσιακών μαθημάτων με δάσκαλο αλλά και ως βάση μιας διαδικτυακής εικονικής μουσικής κοινότητας για την από κοινού μελέτη και εξάσκηση χωρίς γεωγραφικούς περιορισμούς.

Κατά τη λειτουργία της αυτόματης αξιολόγησης της μουσικής εκτέλεσης, το σύστημα αναγνωρίζει τα λάθη του μαθητή, τα ιεραρχεί και επιδιώκει να προσδιορίσει τις αιτίες που οδηγούν σε κάθε λάθος, προτείνοντας παράλληλα και πιθανές μεθόδους για βελτίωση. Αντίστοιχα, το σύστημα αναγνωρίζει τα θετικά σημεία στον τρόπο εκτέλεσης μιας άσκησης από το μαθητή και τα παρουσιάζει επιβραβεύοντάς τον, όπως ακριβώς θα έκανε και ένας σωστός δάσκαλος.

Ένας σημαντικός ρόλος του VEMUS είναι να ενθαρρύνει τους σπουδαστές να ολοκληρώνουν τη μελέτη στο σπίτι. Οι μαθητές συχνά αμελούν να μελετήσουν στο σπίτι και πηγαίνουν στο μάθημα πολλές φορές χωρίς να έχουν προετοιμάσει τις νότες. Αυτό συμβαίνει κυρίως γιατί ο μαθητής συναντάει δυσκολίες στην προσωπική του μελέτη. Ένα πρόγραμμα στον υπολογιστή, που θα λειτουργούσε σαν βοηθός του δασκάλου, θα αύξανε το ενδιαφέρον για μελέτη. Είναι πάντα πιο διασκεδαστικό να παίζεις όταν κάποιος σε ακούει, ακόμα κι αν είναι μόνο ένας υπολογιστής. Ο μαθητής πρέπει να αποκτήσει εμπιστοσύνη στο VEMUS. Αυτό σημαίνει ότι το feedback που θα λαμβάνει από αυτό θα πρέπει να πλησιάζει την παιδαγωγική του δασκάλου.

Το VEMUS στηρίζεται στην γνώση και τα αποτελέσματα του επιτυχημένου έργου IMUTUS που υλοποίησε ένα αποδοτικό περιβάλλον μουσικής εξάσκησης για την φλογέρα. Τα προκαταρκτικά αποτελέσματα από την αξιολόγηση του IMUTUS κατέστησαν φανερή την ισχυρή δυναμική της προσέγγισης που υιοθετήθηκε. Το VEMUS θα συνεχίσει και θα κλιμακώσει τις δραστηριότητες αξιολόγησης, επιδιώκοντας αφενός την συλλογή πυκνότερων και στατιστικά πληρέστερων παρατηρήσεων και αφετέρου τον προσδιορισμό των κρίσιμων εκείνων παραγόντων που θα επιτρέψουν μια ευρύτερης κλίμακας αξιοποίηση του συστήματος. Στα πλαίσια αυτής της προσπάθειας γίνεται η ακόλουθη συλλογή στοιχείων.

Θέματα πρακτικής στη διδασκαλία

Βασικά θέματα που σχετίζονται με αυτήν την ενότητα:

- Πώς να χειριστούμε τις διαφορές κουλτούρας των διαφόρων χωρών
- Πώς θα χτίσουμε την εμπιστοσύνη του μαθητή στο VEMUS

Οι διαφορές ανάμεσα στις διάφορες μουσικές σχολές εκμάθησης (Γερμανική, Γαλλική π.χ.) μπορεί να επηρεάζει την αξιολόγηση που δίνει το πρόγραμμα. Αυτό μπορεί να έχει σχέση με την προφορά στη γλώσσα ή ακόμα με τη μάσκα. Στο VEMUS πάντως η αξιολόγηση της ατάκας πρέπει να γίνεται σε ένα κατανοητό επίπεδο, δηλαδή απλά. Έτσι κι αλλιώς ο ρόλος του δασκάλου είναι πάντοτε σπουδαιότερος από το πρόγραμμα.

Για να σχεδιάσουμε μια κοινή στρατηγική αξιολόγησης της εκτέλεσης για τις διάφορες χώρες, πρέπει να βρούμε τα κοινά στοιχεία.

Το VEMUS πρωτίστως ασχολείται με το να βοηθήσει το μαθητή να βελτιωθεί προσφέροντάς του υλικό για την προσωπική του μελέτη. Επομένως το εκπαιδευτικό υλικό του VEMUS θα πρέπει να είναι παρτιτούρες διαφορετικών επιπέδων με τις οποίες ο μαθητής μπορεί να εξασκηθεί. Η διδασκαλία της θεωρίας της μουσικής και άλλα τέτοια θέματα δεν προβλέπονται από το VEMUS.

1. Ερώτηση : Δίνεται έμφαση από τους δασκάλους σε μικρές ασκήσεις ή σε απλές μελωδίες ανάλογα α) με τη χώρα, β) το όργανο, γ) το επίπεδο του σπουδαστή ;

Στη Σουηδία π.χ. οι μαθητές τυπικά περνάνε 3 σχολές κατά τη διάρκεια 5 χρόνων. Χρησιμοποιούνται επιπρόσθετα μελωδίες και ασκήσεις ανάλογα με τις ανάγκες του μαθητή για να εξασκηθεί περισσότερο σε συγκεκριμένες δυσκολίες. Αυτό το υλικό δίνεται στο μαθητή από τον δάσκαλο σε παρτιτούρες.

Μπορούν επίσης να χρησιμοποιηθούν κάποια παραδείγματα από το παγκόσμιο μουσικό ρεπερτόριο (γνωστά έργα). Επιπλέον η διδασκαλία καθενός από τα διαφορετικά όργανα που μας ενδιαφέρουν απαιτεί διαφορετικό εκπαιδευτικό υλικό.

2. Ερώτηση : Πόσο συχνά ο δάσκαλος παίζει μαζί με τον μαθητή (το ίδιο όργανο ή πιάνο);

3. Ερώτηση : Πότε και πως οι δάσκαλοι κάνουν παρατηρήσεις ; Διακόπτουν τους μαθητές για να τους διορθώσουν ;

Για παράδειγμα, οι Σουηδοί δάσκαλοι γενικά δεν διακόπτουν τους μικρούς μαθητές ενώ παίζουν για να τους διορθώσουν ή για να κάνουν κάποια παρατήρηση. Ο μαθητής αφήνεται να παίζει το κομμάτι μέχρι το τέλος. Ο δάσκαλος γενικά ενθαρρύνει τον μικρό μαθητή επαινώντας τον όσο πιο συχνά γίνεται. Η βασική ιδέα είναι ότι πρέπει να είναι διασκεδαστικό να παίζει κανείς, παρά να περνά μια αυστηρή διαδικασία με σκοπό επαγγελματικές σπουδές.

Διαδικασία μελέτης

Όλοι οι δάσκαλοι δίνουν οδηγίες στους μαθητές τους για τον τρόπο της μελέτης

Για παράδειγμα μια κοινή οδηγία είναι :

Ξεκίνα απλά να παίζεις τις νότες. Απλά μελέτησε τη δαχτυλοθεσία και τις νότες. Θα ασχοληθούμε με πιο δύσκολα πράγματα όπως η αναπνοή και η χρήση της γλώσσας στο μάθημα.

Ο στόχος είναι να βοηθηθεί ο μαθητής να παίζει όλη την άσκηση παρά τις δυσκολίες που θα συναντήσει και τα λάθη που θα κάνει.

Περισσότεροι από δύο δάσκαλοι υποστήριξαν την ιδέα ότι θα ήταν καλό κατά τη διάρκεια της μελέτης στο σπίτι να αυξάνει βαθμιαία η συνθετικότητα των δυσκολιών.

Αυτό σημαίνει ότι το σύστημα πρέπει να μπορεί να κάνει αναγνώριση των δυσκολιών και των ιδιαίτερων θεμάτων που απαιτούν προσοχή, σε κάθε μουσική άσκηση. Ο δάσκαλος μπορεί να προτείνει τη μέθοδο ή τη διαδικασία για να πάει ο μαθητής από το ένα επίπεδο στο επόμενο.

Π.χ.

- Πρώτα η μελέτη της δαχτυλοθεσίας και των νοτών
- Μετά η τονική σωστότητα
- Μετά η άρθρωση (λεγκάτο, στακάτο κ.λ.π.)
- Τέλος όλα μαζί

Ο δάσκαλος θα αποφασίσει τι πρέπει να γίνει στο σπίτι και τι στο μάθημα

Υπάρχουν και άλλες απόψεις, όπως ότι η τονική σωστότητα έχει προτεραιότητα από το ξεκίνημα. Ή, πρώτα προσέχουμε τις αξίες, μετά το pitch (τονική ορθότητα κ.λ.π.

Επίσης προτάθηκε ότι πρέπει η εκτέλεση του μαθητή να αξιολογείται σε πολλά επίπεδα (τουλάχιστον τρία : pitch, άρθρωση, ποιότητα ήχου). Μετά από αρχική εξάσκηση ο μαθητής θα μπορεί να ενεργοποιεί όλες τις παραμέτρους αξιολόγησης ταυτόχρονα.

Επίσης επισημάνθηκε ότι ο δάσκαλος πρέπει να μπορεί να επεμβαίνει και να προτείνει τη μέθοδο με την οποία ο μαθητής θα πρέπει να δουλέψει στο σπίτι

Μια άλλη πρόταση ήταν να χωριστεί η εξάσκηση σε μια μουσική άσκηση σε τρεις τομείς

1ο :Εξάσκηση στις ατάκες Ο μαθητής παίζει τενούτες και παίρνει από το σύστημα feedback όσον αφορά την κυματομορφή με ένα παρόμοιο τρόπο όπως αν έπαιζε μια απλή μελωδία

2ο : Ο μαθητής παίζει μερικές νότες π.χ. ένα μέτρο και εξασκείται στις δυσκολίες της δαχτυλοθεσίας.

3ο : Ο μαθητής παίζει όλη την παρτιτούρα. Λαμβάνει feedback όπως με το IMUTUS

Τέλος , ο μαθητής αν λάβει ικανοποιητικό feedback, μπορεί να προχωρήσει στο επόμενο σετ ασκήσεων. Μπορεί επίσης να υπάρχει κι ένα επιπρόσθετο επίπεδο :

4ο : Ο μαθητής παίζει τη μελωδία με ακομπανιαμένο π.χ. πιάνο.

Σε συζήτηση που έλαβε χώρα ανάμεσα σε δασκάλους από τη Σουηδία σχετικά με το τι feedback θα ήθελαν να παίρνουν οι μαθητές προβλέφθηκε ότι οι μαθητές κατά κύριο λόγο θα ήθελαν να μάθουν.

- Επαιξα σωστά τις νότες; (pitch-τονική ορθότητα)
- Επαιξα σωστά τον ρυθμό; (μετρική ορθότητα)

Σε αυτό το πλαίσιο σημειώθηκε ότι το feedback που δίνει το σύστημα πρέπει να καλύπτει τις σημαντικές, κατά τη γνώμη των μαθητών, πλευρές μιας εκτέλεσης.

4 Ερώτηση : Τα παραπάνω έχουν ήδη συζητηθεί στα πλαίσια συναντήσεων (workshops). Παρακαλούμε προσθέστε η σχολιάστε όπου νομίζετε.

Σχεδιασμός της μελέτης μιας μελωδίας στο VEMUS

5. Ερώτηση : Ποια θα ήταν η δική σας πρόταση για τη βασική ιδέα του σχεδίου μελέτης και τα βήματα της διαδικασίας που πρέπει να χρησιμοποιούν οι μαθητές όταν μελετούν μόνοι τους.

Παράδειγμα τέτοιου σχεδίου στο VEMUS :

Βήμα 1. Μελέτησε το μέρος Α δίνοντας έμφαση στο pitch μέχρι να πάρεις 4 αστέρια

Βήμα 2. Μελέτησε το μέρος Α δίνοντας έμφαση σε όλες τις παραμέτρους μέχρι να καταφέρεις να μην κάνεις κανένα λάθος στις ατάκες

Βήμα 3. Μελέτησε όλο το κομμάτι με έμφαση στο ρυθμό και το pitch μέχρι να πάρεις 4 αστέρια.

Βήμα 4

Γενικά η φόρμα είναι : Βήμα..... : Μελέτησε το τάδε μέρος συγκεντρώσου στην παράμετρο τάδε, μέχρι να

Για να ορίσει το συγκεκριμένο μέρος του κομματιού προς μελέτη και τις παραμέτρους που πρέπει να αξιολογηθούν κατά τη διάρκεια κάθε βήματος, ο δάσκαλος μπορεί :

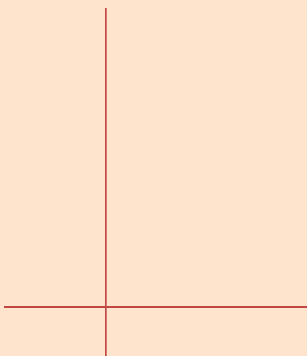
α) να σημειώσει μέρη πάνω στην παρτιτούρα, που ο μαθητής μπορεί να επιλέξει να μελετήσει

β) για κάθε βήμα, μπορεί να περιορίσει την αξιολόγηση από το σύστημα σε μερικούς μόνο τύπους λαθών (π.χ. αξιο-

λόγηση του pitch, ρυθμός, μόνο ατάκες).

Πάντως σε μερικές περιπτώσεις ένας πλήρης χωρισμός μεταξύ των διαφορετικών τύπων λαθών μπορεί να είναι δύσκολος γιατί το ένα είδος λάθους επηρεάζει το άλλο (π.χ. αβεβαιότητα στη δαχτυλοθεσία δίνει λάθος pitch και επηρεάζει τη διάρκεια των νοτών και το ρυθμό επίσης).

γ) να ορίσει τους όρους με τους οποίους ο μαθητής θα θεωρήσει ότι ολοκλήρωσε επιτυχώς το ένα βήμα και μπορεί να προχωρήσει στο επόμενο.



Εκπαιδευτικό περιεχόμενο

Μεγάλες διαφορές είναι αναμενόμενες μεταξύ των μεθόδων (τυπωμένα βιβλία) που χρησιμοποιούν οι διάφορες σχολές στις διάφορες χώρες.

Κάποιες διαφορές αφορούν το εκπαιδευτικό περιεχόμενο και τη δομή του ανάλογα με τα εκπαιδευτικά στυλ των διαφόρων χωρών. Π.χ. : τη σειρά με την οποία εισάγονται οι νότες (π.χ. αρχίζουμε να παίζουμε με το μεσαίο ή το χαμηλό ρετζίστρο)

Ερώτηση : Με ποια σειρά εισάγονται οι νότες σε α) κάθε χώρα, β) κάθε όργανο;

Ρεπερτόριο

(π.χ. γνωστές μελωδίες για παιδιά στην κάθε χώρα)

Είναι σημαντικό να δουλεύουν οι μαθητές στο VEMUS με τις ίδιες μελωδίες που δουλεύουν στα μουσικά σχολεία με τους δασκάλους τους. Γνωστές μελωδίες ή παραδοσιακά τραγούδια των χωρών τους. Αυτές φυσικά οι μελωδίες θα διαφέρουν σημαντικά από χώρα σε χώρα.

Οπτικό υλικό

Επίσης προτάθηκε να προστεθεί στο εκπαιδευτικό υλικό του VEMUS τα βασικά στοιχεία για την σωστή παραγωγή του ήχου στα πνευστά όργανα και η δυνατότητα να οπτικοποιηθεί το πώς επηρεάζει την ατάκα ο τρόπος φυσήματος και η θέση της γλώσσας.

Θεωρήθηκε αναγκαίο να εισαχθούν κάποιες αναπνευστικές ασκήσεις και ασκήσεις εκφοράς ήχου (με τη δυνατότητα να αξιολογούνται από το σύστημα), με επιπρόσθετη ερμηνεία του σωστού τρόπου παίξιματος για τα πνευστά (με εικόνες), υποδεικνύοντας το φύσημα από το διάφραγμα και τη συνεχόμενη ροή του αέρα, όλα αυτά στο περιβάλλον του κάθε οργάνου.

Στην περίπτωση της τρομπέτας έχουμε συγκεντρώσει ήδη κάποιο υλικό στο οποίο το οπτικό υλικό βοηθάει στην κατανόηση (Παράδειγμα 1).

Παράδειγμα 1: 'Ένας 'Δεκάλογος' στην εξάσκηση στην Τρομπέτα από τον Σωκράτης Άνθης

1. Το σώμα πολύ χαλαρό, καλή στήριξη στα δύο πόδια, οι ώμοι χαλαροί και κάτω.
2. Χαλαρή βαθιά εισπνοή, χωρίς να ανασπνώνουμε το στήθος και τους ώμους (Εισπνοή: σαν να οσφραίνομαι διερευνητικά)
3. Χαλαρό το φύσημα της εκπνοής, χωρίς καμιά πίεση ή σφίξιμο (εκπνοή: σαν να ψιθυρίζω).
4. Κλειστά τα χείλη, με στήριξη στις γωνίες των χειλιών (όπως η γέφυρα)
5. Δημιουργία θορύβου στα χείλη (buzzing) με την βοήθεια του εξερχόμενου αέρα. Παίζουμε μερικές νότες με buzzing.
6. Καλή στάση και κράτημα του οργάνου (φωτογραφία). Ίσια πλάτη (καθιστός ή όρθιος). Η γωνία του οργάνου ως προς το σώμα έχει σχέση με τις οδοντοστοιχίες.
7. Η άκρη της γλώσσας πάντα πίσω από τα δόντια. Προφορά της συλλαβής 'τι' για την ατάκα. Η γλώσσα πολύ χαλαρή, καθόλου σφιγμένη, κινείται πάντα με ταχύτητα κατά την διαδικασία της ατάκας, έτσι ώστε να μην διακόπτει την συνεχή ροή του αέρα.
8. Να ηχεί πάντα στο μυαλό η νότα την οποία θέλουμε να παίζουμε.
9. Προσέχουμε πάντα το κούρδισμα είτε παίζουμε μόνοι είτε με άλλους.
10. Τελικός κριτής να είναι πάντα το ηχητικό αποτέλεσμα

5. Ερώτηση : Ποια η άποψη σας για την ενσωμάτωση τέτοιων σχολίων; Θα είχατε να προτείνετε κάτι παρόμοιο;

Δομή του εκπαιδευτικού περιεχομένου

Το περιεχόμενο θα είναι οργανωμένο σε μαθήματα και κεφάλαια ακολουθώντας μια λογική σειρά αυξανόμενης δυσκολίας.

Ενημέρωση και αναδιοργάνωση του περιεχομένου

Κάποια ελευθερία πρέπει να δοθεί στους δασκάλους για να εισάγουν νέο περιεχόμενο.

Είτε υλικό που θα παράγουν οι ίδιοι, ή υλικό που θα αντλούν από άλλες πηγές

να αναδιοργανώνουν το περιεχόμενο για να εξυπηρετήσουν τις ανάγκες της δικής τους τάξης ή σχολής και το δικό τους προσωπικό διδακτικό στυλ.

Αξιολόγηση της εκτέλεσης

Αφού ο μαθητής θα παίζει ένα κομμάτι, το VEMUS θα κάνει αξιολόγηση της εκτέλεσης. Υπάρχουν τουλάχιστον τρία στάδια αυτής της διαδικασίας που το κάθε ένα παρουσιάζει τις δικές του προκλήσεις:

- Πώς το VEMUS θα αναγνωρίζει τα λάθη στις εκτελέσεις των μαθητών
- Πώς το VEMUS θα βάζει τα λάθη που αναγνώρισε σε σειρά προτεραιότητας
- Πώς το VEMUS θα δίνει feedback στον μαθητή.

Είναι καθαρό ότι η συμπεριφορά του συστήματος σε κάθε ένα από τα παραπάνω στάδια πρέπει να είναι αντίστοιχη με :

- το επίπεδο του σπουδαστή και τον προσωπικό του χαρακτήρα
- τις επιλογές του δασκάλου και το διδακτικό στυλ που θέλει εκείνος να επιβάλλει

Κατά τη διάρκεια του εργαστηρίου στη Στοκχόλμη έγινε μια συγκεκριμένη πρόταση για το πώς μπορεί να γίνει ο χειρισμός της αναγνώρισης και της ιεράρχησης αυτών των θεμάτων.

Στοιχεία προς αξιολόγηση στη μαθητική εκτέλεση

Οι δάσκαλοι της μουσικής στις 6 χώρες που συνεργάζονται για το VEMUS πρέπει να συμφωνήσουν στα στοιχεία της εκτέλεσης του μαθητή που πρέπει να κρίνονται και στην ιεράρχηση αυτών των στοιχείων.

Ερώτηση : Συμφωνείτε ότι τα στοιχεία που πρέπει να αξιολογούνται στην εκτέλεση του μαθητή είναι τα ακόλουθα;

- Ατάκες
- Ρυθμικά λάθη
- Μελωδικά λάθη
- Έλεγχος της ροής του αέρα και
- Τεχνική των δαχτύλων

Η ερώτηση αφορά μάλλον την ιεράρχηση αυτών και πώς αυτή η ιεράρχηση αλλάζει καθώς ο μαθητής προχωράει.

Αναγνώριση λαθών

Τα κριτήρια βάσει των οποίων το σύστημα θα αναγνωρίζει τα λάθη μπορούν να βασίζονται σε συγκεκριμένα «όρια». Ιδανικά, τα κριτήρια πρέπει να σχετίζονται με τις τρέχουσες δεξιότητες του μαθητή. Όσο πιο αρχάριος είναι ο μαθητής τόσο πιο ανεκτικό πρέπει να είναι το σύστημα στα λάθη.

Επιπλέον αυτό μπορεί να διορθώνεται και από τον δάσκαλο, να ρυθμίζει το VEMUS ώστε να «συγχωρεί» κάποιους τύπους λαθών κατά τη διάρκεια κάποιας περιόδου.

Ιεράρχηση λαθών

Θεωρείται παιδαγωγικά λάθος για το VEMUS να δείχνει στον μαθητή όλα τα λάθη που αναγνώρισε. Μόνο ένας μικρός αριθμός λαθών πρέπει να επιλέγεται και να υποδεικνύεται, βασισμένος σε μια ιεράρχηση των τύπων λαθών.

Για παράδειγμα, μια υποθετική ιεράρχηση δεξιοτήτων μπορεί να είναι :

- Ατάκες (ποιότητα)
- Ρυθμός
- Έλεγχος της ροής του αέρα
- Μελωδία (pitch)
- Τέμπο (σταθερότητα κ.λ.π.)

Αναδειχθηκε το ερώτημα αν όλοι οι δάσκαλοι δίνουν την ίδια αξιολόγηση για μια δοσμένη εκτέλεση.

Υπήρξε η πρόταση να αφήνεται στο δάσκαλο να αλλάζει τον τρόπο ιεράρχησης των λαθών για κάθε μαθητή σε μια συνεχή βάση (π.χ. εβδομαδιαία)

Υπάρχουν πολλές εναλλακτικές προτάσεις για την ιεράρχηση των δεξιοτήτων.

Μια δοσμένη, προκαθορισμένη ιεράρχηση για όλες τις ηλικίες και τα μαθητικά επίπεδα. Ο δάσκαλος να μη μπορεί να επέμβει καθόλου στην αξιολόγηση του VEMUS.

- Μια προσαρμόσιμη ιεράρχηση που θα δίνεται από τον δάσκαλο για κάθε μαθητή.

α) επιλογή από έναν αριθμό δοσμένων παραμέτρων που σχετίζονται με την ηλικία (ή καλύτερα εξάμηνο παιξίματος). Ο δάσκαλος αποφασίζει μία φορά το εξάμηνο ποιο σετ θα χρησιμοποιηθεί από τον μαθητή.

β) Προσωπικά σετ από τον κάθε μαθητή. Ο δάσκαλος προσαρμόζει την ιεράρχηση από τη μία περίοδο στην άλλη (μηνιαία, εβδομαδιαία...) ανάλογα με το πόσο προχωράει ο μαθητής. Με αυτόν τον τρόπο ο δάσκαλος μπορεί να δώσει έμφαση στον ρυθμό π.χ. για 2 εβδομάδες και να χαμηλώσει τις απαιτήσεις στην μελωδία (σωστές νότες). Εκτός από την ιεράρχηση ο δάσκαλος μπορεί επίσης να προσαρμόσει τα «όρια» για την αναγνώριση των λαθών (πόσο αυστηρά θα εξετάσουμε ένα στακάτο, ή πόσο ακριβής πρέπει να είναι η εκτέλεση ενός παρεστιγμένου κ.λ.π.)

Στη Στοιχόλμη μετά από συζήτηση, οι δάσκαλοι συμφώνησαν σε ένα συνδυασμό των προτάσεων α) και β).

Το σύστημα θα πρέπει να είναι ικανό να δώσει feedback :

για μία μη ολοκληρωμένη εκτέλεση

για εκτελέσεις με μεγάλο αριθμό λαθών.

Η μουσική σχολή του VEMUS

Ερώτηση : Οι δάσκαλοι στις διαφορετικές χώρες πρέπει να απαντήσουν στη βασική ιδέα της «Μουσικής Σχολής του VEMUS» για την υιοθέτηση κριτηρίων αξιολόγησης της εκτέλεσης των μαθητών χρησιμοποιώντας λίστα ιεραρχημένων μουσικών δεξιοτήτων.

Η πρόταση της Στοιχόλμης

Το VEMUS μπορεί να έχει 4 – 5 ορόφους. Οι μαθητές προχωρούν 4 – 5 επίπεδα δεξιοτήτων κατά τη διάρκεια μίας περιόδου 9 – 14 χρόνων. Κάθε επίπεδο αντιστοιχεί σε έναν όροφο. Πρακτικά ένας όροφος θα αντιστοιχεί τυπικά με τις μελωδίες και τις ασκήσεις κάποιων μεθόδων για το όργανο που μας ενδιαφέρει

Σε κάθε όροφο υπάρχουν τρεις δάσκαλοι. Ένας αυστηρός, ένας μεσαίος και ένας ευγενικός. Για κάθε δάσκαλο σε κάθε όροφο υπάρχει μία προκαθορισμένη ιεράρχηση της λίστας δεξιοτήτων και επίσης προκαθορισμένα « όρια» για την αναγνώριση λαθών. Συνολικά 15 σετ.

Ο δάσκαλος λοιπόν θα πρέπει απλώς να επιλέξει τον κατάλληλο όροφο και το σωστό «τύπο δασκάλου» για τον μαθητή του.

Π.Χ. Ο μαθητής μου Στέφανος είναι τώρα στον 2ο όροφο και χρειάζεται έναν ευγενικό δάσκαλο. Αυτή η πληροφορία στέλνεται στο σπίτι μαζί με τον Στέφανο σαν ένας κωδικός στο πρόγραμμα. Οι εκτελέσεις του Στέφανου θα αξιολογηθούν από έναν ευγενικό τύπο δασκάλου που δεν λαμβάνει υπόψη κάποια λάθη και ενθαρρύνει αρκετά το μαθητή.

Το έργο του να ορίσουμε 15 λίστες ιεράρχησης και όρια για την αναγνώριση λαθών για τους ορόφους και τους τύπους των δασκάλων είναι αρκετά δύσκολο και απαιτεί πρώτα συζητήσεις μεταξύ των δασκάλων σε όλες τις συνεργαζόμενες χώρες του VEMUS και κατά δεύτερον αρκετές λούπες επανάληψης κατά τη διάρκεια της αξιολόγησης,

Διαδικασία : Το KTH θα κυκλοφορήσει σύντομα CD με μαθητικές εκτελέσεις και αντίστοιχα ερωτηματολόγια στα οποία θα πρέπει οι δάσκαλοι σε όλες τις χώρες να απαντήσουν σημειώνοντας τα σχόλια και το feedback που θα έδιναν σε ένα κανονικό μάθημα με το συγκεκριμένο μαθητή. Με αυτό τον τρόπο θα σχηματιστούν βασικές λίστες ιεράρχησης των δεξιοτήτων για κάθε όργανο. Αυτές οι λίστες θα χρειαστεί μετά να συζητηθούν και να συμφωνηθούν.

Έκθεση αξιολόγησης του μαθητή

Στη Στοιχόλμη οι δάσκαλοι αποφάσισαν να κρατήσουν τις βασικές αρχές του IMUTUS :

Το σύστημα δίνει μια γενική βαθμολόγηση από 1 έως 5 αστέρια. Η βαθμολογία βασίζεται στο συνολικό αριθμό των λαθών που έχει ανιχνεύσει σε σχέση με τον αριθμό των νοτών του κομματιού. Θα πρέπει να είναι πιο εύκολο να πάρεις περισσότερα αστέρια με τον ευγενικό δάσκαλο.

Το σύστημα δείχνει τα 3 πιο σημαντικά λάθη κρυμμένα πίσω από κουμπιά (4 λάθη για τον αυστηρό δάσκαλο) Η παρουσίαση των θετικών σχολίων πρέπει να ποικίλλει μεταξύ των 3 τύπων δασκάλων. Χοντρικά 25% (1 θετικό για κάθε 4 σχόλια) για τον «ευγενικό», 15% για τον «μεσαίο» και 10% για τον «αυστηρό».

Πάντως ο μειωμένος αριθμός λαθών θεωρήθηκε ως ελάττωμα

Το feedback δίνεται σαν ένα κείμενο – μήνυμα και μια high-lighted σημείωση δείχνει το σημείο του λάθους.

Προτάθηκε επίσης να χρησιμοποιείται μουσική σημειολογία και όχι κείμενο για τα λάθη και την αξιολόγηση. Π.χ. να σημειώνεται ο ήχος με άλλο χρώμα για να είναι ορατή η διόρθωση όταν ο μαθητής κάνει λάθος (όπως στο InTheChair)

βελάκια προς τα πάνω ή κάτω για τη διόρθωση στο pitch

βελάκια προς τα δεξιά ή αριστερά για το τέμπο

ρυθμικές αξίες για το ρυθμό κ.λ.π.

Δύο επίπεδα βοήθειας είναι αρκούντως ('get hint,' 'get help').

Γραφική οπτικοποίηση της εκτέλεσης του μαθητή και άλλων αντίστοιχων εκτελέσεων συζητιέται επίσης.

4 Ερώτηση : Τα παραπάνω έχουν ήδη συζητηθεί στα πλαίσια συναντήσεων (workshops). Παρακαλούμε προσθέστε τη σχολιάστε όπου νομίζετε.

Οπτικοποίηση

Το VEMUS θα δίνει επίσης ένα σετ από γραφικές οπτικοποιήσεις που θα έχουν στόχο να βοηθήσουν τους μαθητές να καταλάβουν καλύτερα τα λάθη τους και να έχουν πιο καλή εικόνα του τι παίζουν και πως θα το βελτιώσουν.

Real time Feedback

Αποτελείται από :

pitch : Το σύστημα δίνει μια καμπύλη (ανιούσα ή κατιούσα) την ώρα που ο μαθητής παίζει τενούτες, σε ένα ξεχωριστό παράθυρο. Μετά την εκτέλεση, απλοποιημένα σημάδια μπορούν να δείχνουν το περίγραμμα του pitch πάνω από τις αντίστοιχες νότες.

Ποιότητα ήχου : Η χαμηλή ποιότητα στον ήχο συχνά συνδέεται με κακή intonation και είναι σημάδι ότι καλού ελέγχου της ροής του αέρα (π.χ. ο μαθητής κουράζεται) Μπορούμε να δοκιμάσουμε ένα κείμενο που θα αναβοσβήνει : «Συνέχισε να φυσάς! Περισσότερο αέρα!»

Τέμπο : Όταν υπάρχει μια αδικαιολόγητη αλλαγή στο τέμπο (που δεν οφείλεται σε προφανείς τεχνικές δυσκολίες), ο δάσκαλος προσπαθεί να συγκεντρώσει την προσοχή του μαθητή, χτυπώντας τα χέρια του ή παίζοντας μαζί του στο πιάνο για να κρατήσει σταθερό το τέμπο. Στο VEMUS μπορεί να ενεργοποιείται το κλικ ενός μετρονόμου που αρχίζει με το τέμπο που έχει εκείνη τη στιγμή ο μαθητής και επιταχύνει/ επιβραδύνει μέχρι το επιθυμητό τέμπο. Εναλλακτικά μπορεί να χρησιμοποιηθεί ο κέρσορας. Όταν το σύστημα διαπιστώσει μια αδικαιολόγητη αλλαγή στο τέμπο, ο κέρσορας σταματάει να ακολουθεί το τέμπο του μαθητή και προχωράει μπροστά με επιτάχυνση/ επιβράδυνση σύμφωνα με το σωστό τέμπο.

Η Οπτικοποίηση της δακτυλοθεσίας

Μια στατική εικονοσκόπηση 3 διαστάσεων (που αλλάζει δάχτυλα όταν κάνουμε κλικ πάνω σε άλλη νότα) είναι χρήσιμη, με την προϋπόθεση ότι η θέση, η εμφάνιση και το σχήμα των δαχτύλων είναι σωστά. Επίσης το μέγεθος της κίνησης πρέπει να είναι ρεαλιστικό. Αυτό σημαίνει όμως ότι σε μερικές περιπτώσεις δεν είναι εύκολο να βλέπεις αν οι τρύπες είναι κλειστές ή όχι.

Ένα συνηθισμένο γραφικό σχέδιο με άδειους και γεμάτους κύκλους είναι ένα απαραίτητο συμπλήρωμα.

Ένα animation 3 διαστάσεων που εικονίζει τη δακτυλοθεσία και είναι συγχρονισμένο με ένα MIDI συνθεσάιζερ που παίζει το κομμάτι θεωρήθηκε ότι δεν έχει παιδαγωγική αξία.

Επίσης προτάθηκε για τα όργανα με καλάμι και με επιστόμιο να επιμείνουμε στη σωστή θέση επισυνάπτοντας εικόνες που κάνουν ορατή τη σωστή θέση των χειλιών.

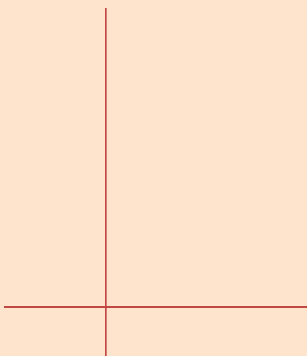
Άλλες οπτικοποιήσεις

Ειπώθηκε ότι η γραφική αναπαράσταση του πως πρέπει κανείς να χρησιμοποιεί τη γλώσσα την ώρα που φυσάει στο όργανο βοηθάει στην πιο σωστή και καλύτερη ατάκα.

Υπάρχει ανάγκη όχι μόνο να ανιχνεύεται η κακή ατάκα αλλά και να αναπαριστάνεται γραφικά, πώς μπορεί να διορθωθεί αυτό το λάθος. Μπορούμε να αντλήσουμε υλικό για το πώς να προετοιμάσουμε αυτά τα διαγράμματα από

υπάρχουσες μεθόδους.

Πάντως φαίνεται ότι για τη βελτίωση της ατάκας είναι δύσκολο να βοηθηθεί κανείς από διαγράμματα και η βοήθεια του δασκάλου είναι αναντικατάστατη



Δουλεύοντας με το περιβάλλον του συστήματος

Εξάσκηση μέρους της μελωδίας

Κοινή παρατήρηση σε όλα τα εργαστήρια είναι ότι πρέπει κανείς να μπορεί να παίζει μέρος της μελωδίας και να παίρνει πάνω σ' αυτό την αξιολόγηση από το σύστημα

Πιο ειδικά :

Ο μαθητής πρέπει να μπορεί να επιλέξει οποιοδήποτε μέρος που υποδεικνύεται σαν φράση στην παρτιτούρα (π.χ. με σημμάδια αναπνοής ή λεγκατούρες φράσης)

Ο μαθητής πρέπει να μπορεί να επιλέξει οποιοδήποτε μέρος της μελωδίας με το ποντίκι.

Το σύστημα πρέπει να είναι σε θέση να αξιολογεί και να δίνει feedback στον μαθητή ακόμα κι αν αυτός δεν έπαιξε όλο το κομμάτι.

Επιπλέον ο δάσκαλος θα πρέπει να μπορεί να σημειώσει μέρη του κομματιού που πρέπει να μελετήσει ο μαθητής και να ορίσει τις παραμέτρους βάσει των οποίων πρέπει το σύστημα να αξιολογήσει την εκτέλεσή του.

Η ιδέα του «παίξε μετά από μένα»

Στη Στοκχόλμη το «παίξε μετά από μένα» θεωρήθηκε χρήσιμο για να αντιμετωπισθούν πιο σύνθετα λάθη (π.χ. ο ρυθμός)

Σύμφωνα με αυτό, το σύστημα δεν δίνει μηνύματα με κείμενα για τη διόρθωση των λαθών. Αντίθετα προσκαλεί το μαθητή να ακούσει τα επιλεγμένα μέρη που ο υπολογιστής τα παίζει σωστά με το MIDI συνθεσάιζερ (ή ακούγεται το αντίστοιχο μέρος από την υποδειγματική εκτέλεση με όργανο). Ο μαθητής επαναλαμβάνει τα μέτρα και η διαδικασία επαναλαμβάνεται μερικές φορές. Μια απλή αξιολόγηση (Σωστά ! ή Προσπάθησε ξανά !) θα ήταν προτιμότερη μετά από κάθε προσπάθεια

Μετρονόμος

Οι μαθητές δεν χρησιμοποιούν συχνά στη μελέτη τους μετρονόμο, αλλά πρέπει να υπάρχει αυτή η δυνατότητα

Συνοδεία

Συνοδεία από CD, κατά προτίμηση από ζωντανές ηχογραφήσεις χρησιμοποιούνται συχνά κατά τη διάρκεια των μαθημάτων ή κατά τη μελέτη στο σπίτι. Το μέρος της μελωδίας μπορεί να αφαιρεθεί. Η αξιολόγηση του VEMUS σε μια εκτέλεση είναι δυνατή αν ο μαθητής ακούει με ακουστικά. Όμως επειδή το τέμπο είναι προκαθορισμένο και ο ρυθμός συχνά ακολουθεί την ηχογράφιση, η παιδαγωγική αξία της αξιολόγησης μπορεί να είναι αμφισβητήσιμη.

Αυτόματο γύρισμα σελίδας

Το αυτόματο γύρισμα της σελίδας όπως αυτό γίνεται στο IMUTUS θεωρήθηκε ότι είναι πολύ επιτυχές.

Καταγραφή της προόδου

Το VEMUS θα χρειαστεί να κρατάει στη μνήμη μια καταγραφή των εκτελέσεων του μαθητή για μελλοντική αναφορά και για να είναι προφανής η πρόοδός του.

Άλλα θέματα σχεδιασμού

Συμπεριφορές μαθητών ύστερα από τη χρήση του VEMUS στη μελέτη.

Η μαγνητοφώνηση ενός μαθητή με ένα μικρόφωνο εμπεριέχει κάποια προβλήματα.

Μοιάζει με το συναισθημα του μαθητή όταν παίζει μπροστά σε κάποιο ακροατήριο. Κάποιοι μαθητές μπορεί να αντιδρούν σ' αυτό. Ένας τρόπος να αποφύγουμε αυτή την αντίδραση είναι να δώσουμε τη δυνατότητα από το σύστημα να παίζονται κάποια μέρη του κομματιού, να απαιτεί λιγότερο τέλειες εκτελέσεις και να αξιολογεί τα μέρη του κομματιού, όπως ολόκληρο το κομμάτι.

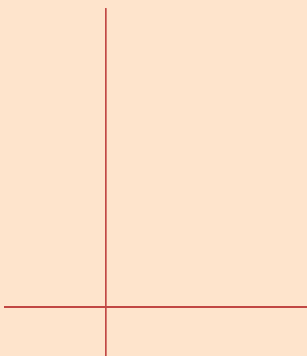
Η εμπειρία από το IMUTUS ήταν, ότι οι μαθητές ενθαρρύνονται να μελετήσουν όταν κάποιος τους ακούει και αξιο-

λογεί τις εκτελέσεις τους. Είναι πιο συγκεντρωμένοι στη μελέτη από τους συμμαθητές τους που απλά παίζουν μπροστά σε ένα αναλόγιο.

Επίσης στις περισσότερες περιπτώσεις οι μαθητές θέλουν να δουν ότι βελτιώθηκαν ύστερα από τη μελέτη τους. Φυσικά αυτό μπορεί να μην ταιριάζει σε όλα τα παιδιά.

Υποστήριξη του ρόλου του γονιού.

Επίσης συζητήθηκε ότι το σύστημα θα μπορούσε να υποστηρίζει το ρόλο του γονιού ή κάποιου που δεν ξέρει μουσική αλλά θέλει να παρακολουθεί την πρόοδο του μαθητή. Θα ήταν καλό αν το VEMUS μπορούσε να δίνει στο γονιό απλές και κατανοητές πληροφορίες που αφορούν την πρόοδο του παιδιού και να τον βοηθούν να υποστηρίζει τον μαθητή. Πάντως θεωρήθηκε ότι κάτι τέτοιο είναι μάλλον δύσκολο.



B. Appendix for 'Evaluation'

B.1 Music performance

TEACHER ASSESSMENT OF STUDENT RECORDINGS

The first evaluation task is aimed at clarinet teachers. Teachers in Sweden and Greece have received a CD with 10 clarinet student recordings, the accompanying score for each of the 10 melodies and a form to guide the evaluation of each performance. They were asked to provide comments similarly to how they would comment a performance in a real teaching situation. Also there were some other questions. The written instructions to the teachers were:

Instructions for assessment of a student performance

This CD contains 10 recordings of instrument students at different levels (track 1-10). Listen and fill out one assessment form per recording. The scores for the examples are provided. Comment spontaneously as you would if it had been an ordinary class, using the same language and approach as you would have then. Do not engage in a too detailed analysis, we estimate approximately 10-15 minutes per recording should be sufficient.

- 1) Make an overall appreciation of the performance (5 pt rating)
- 2) Indicate approximately how many comments you would give to the student if a real situation it was
- 3) To an expert/colleague:
Write your most important comments about the performance, both positive and negative. Imagine that the comments are for a teacher/musician. We are not looking for what you would say to the student - that will be covered in the following question. Sort the comments by placing the most important comment first (a) and then in descending order (b) (c)... Do not attempt to make a complete list of everything that you can find: 2-3 comments may be sufficient – 6-7 is very ambitious. If you want to, you may further clarify comments with signs and characters in the score. Make a reference with a letter in a circle for respective comment. When using unconventional signs please explain them.
- 4) For the student (formulate as if speaking to the student):
Write what you would say to the student as if the performance took place during class. (First your first spontaneous comment – then for example positive aspects and the most important errors/flaws) Write down if there are any consistent errors in the performance (e.g. the attacks).
- 5) For the student (formulate as if speaking to the student):
Suggest which instructions and advices that you would give to the student so that he or she would be able to correct the errors/flaws from the prior item.

B.2 Music study strategies

B.2.1 Pretest student questionnaire (CODE: MSst1)

A few questions on music study practice!

There is no right way of studying. It all depends on what suits your own style and the music kind you are studying. The following questions have been carefully selected to aspects of studying. It is accordingly important that you

answer each question as honestly as you can

How to Answer

For each item there is a row of boxes for a five-point scale on the Answer Sheet:

The numbers stand for the following responses:

5 -- this item is always or almost always true of me

4 -- this item is frequently true of me

3 -- this item is true of me about half the time

2 -- this item is sometimes true of me

1 -- this item is never or only rarely true of me.

Example

I study best with the radio on.

If this was almost always true of you, you would click on 5.

If you only sometimes studied well with the radio on, you would click on 2.

Click on the number on that best fits your immediate reaction. Do not spend a long time on each item: your first reaction is probably the best one. Please answer each item.

1.	I find that at times studying music me a feeling of deep personal satisfaction.	5	4	3	2	1
2.	I think browsing around is a waste of time, so I only study seriously what's given out in class or in the course outlines.	5	4	3	2	1
3.	I am discouraged by a poor comments on my performance and worry about how I will do on the next lesson.	5	4	3	2	1
4.	I have a strong desire to excel in all my school work.	5	4	3	2	1
5.	I think it is enough to learn more musical scores by rote, going over and over them until I know them by heart.	5	4	3	2	1
6.	In playing new songs I often find that I'm reminded of other pieces I already know and see the latter in a new light.	5	4	3	2	1
7.	I feel that virtually any kind of music style can be highly interesting once I get into it.	5	4	3	2	1
8.	I try to do all of my music practice homework as soon as possible after they are given out.	5	4	3	2	1
9.	Even when I have studied hard for a lesson or a concert, I worry that I may not be able to do well in it.	5	4	3	2	1
10.	I find that studying music can at times be as exciting as a good novel or movie.	5	4	3	2	1
11.	I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.	5	4	3	2	1
12.	I usually become increasingly absorbed in my music practice the more I do.	5	4	3	2	1
13.	I learn best from lecturers who work from carefully prepared notes and outline major points neatly on the blackboard.	5	4	3	2	1
14.	I see getting high grades as a kind of competitive game, and I play it to win.	5	4	3	2	1
15.	I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.	5	4	3	2	1
16.	I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgment.	5	4	3	2	1
17.	I try to relate new material, as I am reading it, to what I already know on that topic.	5	4	3	2	1
18.	I keep neat, well-organized notes for most subjects.	5	4	3	2	1

Thank you

B.2.2 Posttest student questionnaire (CODE: MPIst2)

A few questions on music study practice!

Now that you have been playing with VEMUS for over three weeks we would like to ask you again about music practicing. Remember, the way of practicing depends on what suits your own style and it is accordingly important that you answer each question as honestly as you can.

How to Answer

For each item there is a row of boxes for a five-point scale on the Answer Sheet:

The numbers stand for the following responses:

5 -- this item is always or almost always true of me

4 -- this item is frequently true of me

3 -- this item is true of me about half the time

2 -- this item is sometimes true of me

1 -- this item is never or only rarely true of me.

Example

I study best with the radio on.

If this was almost always true of you, you would click on 5.

If you only sometimes studied well with the radio on, you would click on 2.

Click on the number on that best fits your immediate reaction. Do not spend a long time on each item: your first reaction is probably the best one. Please answer each item.

19.	I find that at times studying music me a feeling of deep personal satisfaction.	5	4	3	2	1
20.	I think browsing around is a waste of time, so I only study seriously what's given out in class or in the course outlines.	5	4	3	2	1
21.	I am discouraged by a poor comments on my performance and worry about how I will do on the next lesson.	5	4	3	2	1
22.	I have a strong desire to excel in all my school work.	5	4	3	2	1
23.	I think it is enough to learn more musical scores by rote, going over and over them until I know them by heart.	5	4	3	2	1
24.	In playing new songs I often find that I'm reminded of other pieces I already know and see the latter in a new light.	5	4	3	2	1
25.	I feel that virtually any kind of music style can be highly interesting once I get into it.	5	4	3	2	1
26.	I try to do all of my music practice homework as soon as possible after they are given out.	5	4	3	2	1
27.	Even when I have studied hard for a lesson or a concert, I worry that I may not be able to do well in it.	5	4	3	2	1
28.	I find that studying music can at times be as exciting as a good novel or movie.	5	4	3	2	1
29.	I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.	5	4	3	2	1
30.	I usually become increasingly absorbed in my music practice the more I do.	5	4	3	2	1
31.	I learn best from lecturers who work from carefully prepared notes and outline major points neatly on the blackboard.	5	4	3	2	1
32.	I see getting high grades as a kind of competitive game, and I play it to win.	5	4	3	2	1
33.	I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.	5	4	3	2	1
34.	I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgment.	5	4	3	2	1
35.	I try to relate new material, as I am reading it, to what I already know on that topic.	5	4	3	2	1
36.	I keep neat, well-organized notes for most subjects.	5	4	3	2	1

Thank you

B 2.2.3 NOTE for B.2.1 Pretest student questionnaire (CODE: MSst1) and B.2.2 Posttest student questionnaire (CODE: MPIst2)

questionnaire study analysis

The above 18 items are related to the three levels of learning.

1.	I find that at times studying music me a feeling of deep personal satisfaction.	Deep	- interest in the subject
2.	I think browsing around is a waste of time, so I only study seriously what's given out in class or in the course outlines.	Surface	- Little interest in content
3.	I am discouraged by a poor comments on my performance and worry about how I will do on the next lesson.	Achieving	Achieving high marks
4.	I have a strong desire to excel in all my school work.	Achieving	Compete with others
5.	I think it is enough to learn more musical scores by rote, going over and over them until I know them by heart.	Surface	Rote learning of facts and ideas
6.	In playing new songs I often find that I'm reminded of other pieces I already know and see the latter in a new light.	Deep	Personal understanding
7.	I feel that virtually any kind of music style can be highly interesting once I get into it.	Surface	Little real interest in content
8.	I try to do all of my music practice homework as soon as possible after they are given out.	Surface	Focusing on task components in study isolation
9.	Even when I have studied hard for a lesson or a concert, I worry that I may not be able to do well in it.	Achieving	Achieving high marks
10.	I find that studying music can at times be as exciting as a good novel or movie.	Deep	Interest in the subject
11.	I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.	Surface	Focusing on task components in study isolation
12.	I usually become increasingly absorbed in my music practice the more I do.	Deep	Interest in the subject
13.	I learn best from lecturers who work from carefully prepared notes and outline major points neatly on the blackboard.	Deep	Personal understanding
14.	I see getting high grades as a kind of competitive game, and I play it to win.	Achieving	Achieving high grades
15.	I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.	Surface	Fear of failure
16.	I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgment.	Surface	Fear of failure
17.	I try to relate new material, as I am reading it, to what I already know on that topic.	Deep	Personal understanding
18.	I keep neat, well-organized notes for most subjects.	Surface	Focusing on task components in study isolation

B.3 Affect and Attitude

B 3.1 Students Questionnaires

Students Questionnaire (Week 1, Week 2)

Introduction to questionnaire for Week 1:

Hi! Now you have been working with IMUTUS for a week. We have a few questions for you.

Introduction to questionnaire for Week 2:

Hi again! Now you have been working with IMUTUS for one more week. What do you believe and think now?

1. How do you experience the work with the computer software? (Πως σου φαίνεται η δουλειά με το VEMUS;)
a) Very boring, Pretty boring, Pretty funny, Very funny
b) Very hard, Pretty hard, Pretty easy, Very easy
2. Did you ever get stuck? (Κόλλησες καθόλου;)
Never, Sometimes, Often, Always
3. How often did you need to get help? (Πόσο συχνά χρειάστηκε να πάρεις βοήθεια;)
Never, Once, Twice, Many times
4. What do you feel about the next week? Is it going to be.....
More fun, Fun as before, Boring as before, More boring
5. What do you believe? Will the software make your recorder playing
Much better, Somewhat better, As good as now

Students Questionnaire (Week 3)

Hi again! Now you have been working with IMUTUS for one more week (the last). What do you believe and think now?

1. How do you experience the work with computer software this week compared with the last week?
a) Much more boring, A bit more boring, Same, A bit more funny, Much more funny
b) Much harder, A bit harder, Same, A bit easier, Much easier
2. Did you ever get stuck?
Never, Sometimes, Often, Always
3. Did you need to get help anytime?
Never, Once, Twice, Many times
5. What do you believe after this last week? The software has makes me.....
Much better, Somewhat better, As good as now
6. What do you believe that your teacher think about the software?
Very good, Pretty good, Pretty bad, Very bad
7. I believe that my teacher thinks I have been...
Much better, Somewhat better, As good as now
8. If the software was yours, how often do you think you would use it?
Never, A little, Sometimes, Often, Very Often
9. If your teacher had access to the software, how often do you think he/she would use the software in their teaching?
Never, A little, Sometimes, Often, Very Often
10. What do you feel about computers?
Very boring, Pretty boring, Pretty funny, Very funny
11. At what place do you make use of a computer?
Never, At home, At school, With friends, With relatives
12. If you use a computer, for what purpose do you use it?
Playing games, Internet, Draw, Write, Music listening, Something else, what? (Open-ended)
13. How often do you use a computer?
Every day
Several times a week
Once in a week
Once in 14 days

Once in the month
Seldom
Never

14. What do you feel about playing recorder?
 - a) Very boring, Pretty boring, Pretty funny, Very funny
 - b) Very hard, Pretty hard, Pretty easy, Very easy
15. Would you like to play another musical instrument?
No, Yes, what instrument? Piano, Guitar, Flute, Drums, Bass, Trumpet, Violin, Other
16. Explain in your own words what has been good with IMUTUS and what has been bad. (open-ended)
17. Age (open –ended)
18. Gender (open –ended)

THANKS for your participation!

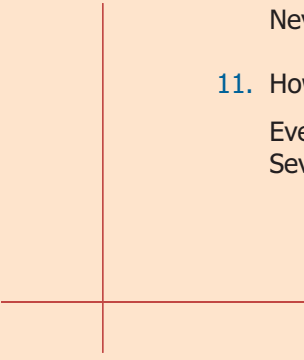
B 3.2 Teachers Questionnaires

Teachers Questionnaire (After Week 3)

Dear Teacher!

Thank you for your participation in the IMUTUS investigation. In this questionnaire you will find questions about music and the teaching topics of this computer software. We are very grateful for your participation in this investigation, and guarantee that your answers will be treated confidentially.

1. What was your expectation when you heard about IMUTUS for the first time?
Explain in your own words the first impression or thought you had. (Open-ended)
2. What was your experience of the demonstrations of this software?
 - a) Very boring, Pretty boring, Pretty funny, Very funny
 - b) Very hard, Pretty hard, Pretty easy, Very easy
 - c) Very inefficient, Pretty inefficient, Pretty efficient, Very efficient
 Comment: (Open-ended)
3. How do you believe that your student/ students experienced the work with the Imutus software?
 - a) Very boring, Pretty boring, Pretty funny, Very funny
 - b) Very hard, Pretty hard, Pretty easy, Very easy
 - c) Very inefficient, Pretty inefficient, Pretty efficient, Very efficient

4. With regard to your previous pedagogical experiences, do you think that a computer software like this could have any future for music and education?
No, not at all, Doubtfully, Yes, under certain conditions, Yes, absolutely
Comment: (Open-ended)
5. Did you notice if there were any characteristics in this computer software that were especially good or bad with regard to pedagogy? (Open-ended)
6. Based on your experience as a music teacher, do you think that your student/s which used IMUTUS improved by the computer software compared to the control student/ s who practised under similar conditions, but without the software
a) After the first week
No, Doubtfully, Yes, Comment: (Open-ended)
a) After the second week
No, Doubtfully, Yes, Comment: (Open-ended)
a) After the third week
No, Doubtfully, Yes, Comment: (Open-ended)
a) Totally after three weeks
No, Doubtfully, Yes, Comment: (Open-ended)
7. Which of the following alternatives do you think fits best with your student/s reaction on the computer software?
a) More happy, More depressed
b) Higher motivation, Lower motivation
c) Higher degree of concentration, Lower degree of concentration
d) Good learnability, Bad learnability
8. Suppose that the software would be developed from a prototype to a finished computer software, would you then prefer to use the software in your education?
No, Doubtfully, Yes, absolutely
9. Do you have any previous experience of using computer softwares in your teaching?
Nothing, A little bit, Pretty much, Very much, If you have, what software was it?
(Open-ended)
10. How often do you use a computer privately?
Every day
Several times a week
Once in a week
Once in 14 days
Once in the month
Seldom
Never
11. How often do you use a computer in your work?
Every day
Several times a week
- 

Once in a week
Once in 14 days
Once in the month
Seldom
Never

12. How would you like to describe your self as a user of computers?
No experienced at all, Rather experienced, Very experienced
13. What is your interest in computers?
Very little, Pretty small, Pretty big, Very big
14. What is your attitude to computers as a tool for music education in general? Your motivation (Open-ended)
15. Explain in your own words your experience of IMUTUS now three weeks later and how that feeling corresponds with your first expectations (Open-ended)
16. Age (Open-ended)
17. Gender (Open-ended)
18. Your education (Open-ended)

THANKS for your participation!

B.4 Collaboration

Pre-and Postest collaboration questionnaire

Context of collaboration

- ☐ Asynchronous collaboration via e-mail
- ☐ Asynchronous collaboration via the VEMUS online environment
- ☐ Synchronous collaboration via the VEMUS online environment
- ☐ Synchronous collaboration in the classroom, using VEMUS
- ☐ Asynchronous collaboration in the classroom, using VEMUS
- ☐ Other:

- ☐ Collaboration between two individual students
- ☐ Collaboration among more than two individual students
- ☐ Collaboration between two groups of students
- ☐ Collaboration among more than two groups of students
- ☐ Other:

Who decided the composition of the collaborative groups?

- ☐ The teacher

- ☐ The students
☐ The teacher and the students, consulting together
☐ Other:

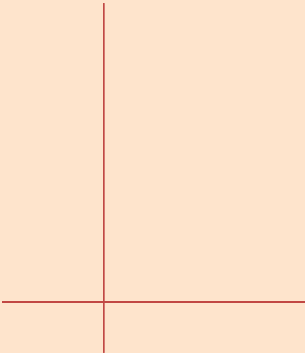
How much did you like these aspects?

	Not at all			Very much
Learning music with technology	1	2	3	4
Learning music through collaboration with others in my classroom	1	2	3	4
Learning music together with people from other places	1	2	3	4

Do you agree with these statements or not? To what extent?

	I absolutely disagree			I absolutely agree	I have no opinion
I liked working and communicating with other students to complete my music course-work	1	2	3	4	0
When learning music, I just want to work and communicate with my teacher, not my peers	1	2	3	4	0
When learning music, I like concentrating on myself and learn alone	1	2	3	4	0
I liked learning from other students	1	2	3	4	0
I had no problem receiving peer feedback and criticism in the group	1	2	3	4	0
I had no problem giving feedback and criticism to my peers in the group	1	2	3	4	0
I like working together with other students who are at different levels of music knowledge and skills	1	2	3	4	0
I think students should choose and decide among them who will be in their group	1	2	3	4	0
I think the teacher should decide the composition of the groups	1	2	3	4	0
My group was too large and I felt lost in the crowd	1	2	3	4	0
My group was too small and I felt too exposed to the others	1	2	3	4	0
My group was too small and I felt overloaded with things to do	1	2	3	4	0
The size of the group was just about right	1	2	3	4	0
Defining member roles in my team was easy	1	2	3	4	0
I believe that learning music collaboratively helps build confidence in those with weaker skills	1	2	3	4	0
I believe that learning music collaboratively helps those who are good to realize that they can still learn from their peers	1	2	3	4	0
Working collaboratively in the group helped me organize myself and my study better	1	2	3	4	0

Working collaboratively in the group helped me rely less on my teacher	1	2	3	4	0
For the collaborative music lesson to succeed, everyone in the group should have the same culture	1	2	3	4	0
In music learning, participants' personalities play a crucial role in a successful collaboration	1	2	3	4	0
All team members did their best	1	2	3	4	0
Our team worked well	1	2	3	4	0
I am really proud of our work in the team	1	2	3	4	0
I could not have achieved so much on my own	1	2	3	4	0
Through collaboration with peers I learned more than I had anticipated	1	2	3	4	0
You learn better when you collaborate virtually, than when you work with other students face to face	1	2	3	4	0
Collaborating virtually is more enjoyable than face to face teams	1	2	3	4	0
My peers in my class were more helpful than the virtual ones	1	2	3	4	0
My peers in my class did more work than the virtual ones	1	2	3	4	0
Overall, I would prefer a face to face team to virtual collaboration for the same music learning task	1	2	3	4	0
To collaborate virtually, you need to be very good at computers and the internet	1	2	3	4	0
I was sufficiently prepared for the collaborative learning activities	1	2	3	4	0
I felt there was time pressure	1	2	3	4	0
I felt it was taking too long	1	2	3	4	0
It went better than expected	1	2	3	4	0
I would do it again	1	2	3	4	0



C. Appendix for 'Validation'

C.1 ValNet Validation Questionnaire for Teachers

This structured validation tool is designed as a proposal for making *validation instrument* for teachers within the project. The validation tool might be used as a *questionnaire* to be sent to teachers or as *guidelines* either for *structured individual interviews* or for *structured group discussions* in case a group is involved.

The following questionnaire should be used at the *end of the project* for the final assessment and/or *after 3-6 month after the end of the project* for a follow-up assessment of the operational performance as well as the services and results of the specific project. Furthermore you will have again the possibility to match your expectations and predictions formulated earlier in the project with the actual outcomes and impact of the project.

In the following you will again be presented with the *following options to answer to the questions*: (a) open questions, where we would like you to write down your thoughts; (b) tick boxes, where we would like you to mark the most appropriate answer and finally with (c) ratings on a scale from 0 to 5. Number 0 should be chosen when the question is "Not applicable", 1 stands for "Low" e.g. to be used in case you expect small added value for your school and 5 for "High" to be marked in case of e.g. anticipated high added value.

Basic Description of the School Project

Title: _____

Acronym: _____

Responsible Person at your school: _____

Responsible Person within the project: _____

Start date: _____

End date: _____

Language: _____

A. Validation of Pedagogical Aspects (Teaching & Learning)

Remarks

How much will you finally estimate that your teaching practice has changed with the use of VEMUS?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the amount of learner interaction in comparison to the beginning of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate your use of VEMUS for professional development in comparison to the beginning of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

How would you estimate the effectiveness of your use of VEMUS in relation to the methodological framework, compared to how it was before the start of this project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you estimate your needs for pedagogical VEMUS-support in comparison to the beginning of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the integration of VEMUS in your current curriculum?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

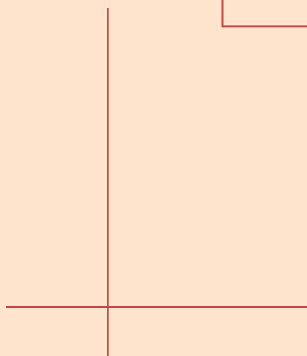
B. Validation of Technological Aspects

Remarks

How is the quality of educational solutions developed by the project and/or developed by teachers and learners within the framework of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would is the integration of newly developed VEMUS solutions in your existing technological equipment (incl. maintenance, updates)?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

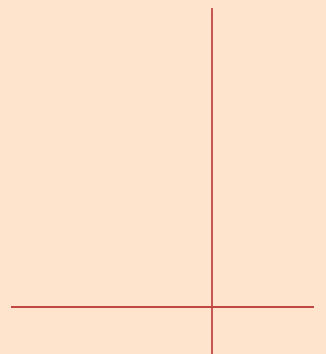
C. Additional Ideas and Comments

Describe (with a few keywords) what has been the most important changes to you?

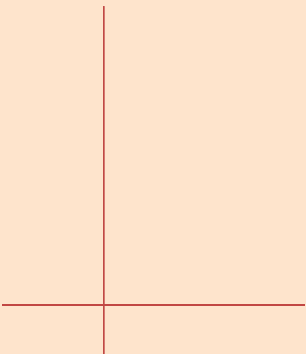


In general which changes would you like to recommend?

Which other improvements would you like to recommend?



Any other suggestions?



C.2 ValNet Validation Questionnaire for Learners

This structured validation tool is designed as a proposal for making *validation instrument* for learners within the project. The validation tool might be used as a *questionnaire* to be sent to teachers or as *guidelines* either *for structured individual interviews* or *for structured group discussions* in case a group is involved.

The following questionnaire should be used at the *end of the project* for the final assessment and/or *after 3-6 month after the end of the project* for a follow-up assessment of the operational performance as well as the services and results of the specific project. Furthermore you will have again the possibility to match your expectations and predictions formulated earlier in the project with the actual outcomes and impact of the project.

In the following you will again be presented with the *following options to answer to the questions*: (a) open questions, where we would like you to write down your thoughts; (b) tick boxes, where we would like you to mark the most appropriate answer and finally with (c) ratings on a scale from 0 to 5. Number 0 should be chosen when the question is “Not applicable”, 1 stands for “Low” e.g. to be used in case you expect small added value for your school and 5 for “High” to be marked in case of e.g. anticipated high added value.

Basic Description of the School Project

Title:	
Acronym:	_____
Responsible Person at your school:	_____
Responsible Person within the project:	_____
Start date:	_____
End date:	_____
Language:	_____

A. Validation of Pedagogical Aspects (Teaching & Learning)

Remarks

How much will you finally estimate that your learning practice has changed with the use of VEMUS?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the amount of learner interaction in comparison to the beginning of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate your use of VEMUS for professional development in comparison to the beginning of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

How would you estimate the effectiveness of your use of VEMUS in relation to the methodological framework, compared to how it was before the start of this project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you estimate your needs for pedagogical VEMUS-support in comparison to the beginning of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the integration of VEMUS in your current curriculum?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

B. Validation of Technological Aspects Remarks

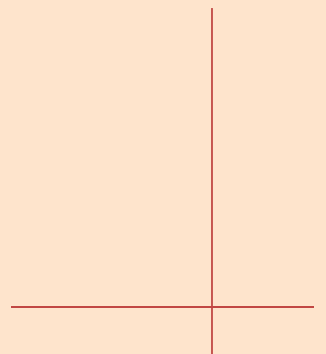
How is the quality of educational solutions developed by the project and/or developed by teachers and learners within the framework of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would is the integration of newly developed VEMUS solutions in your existing technological equipment (incl. maintenance, updates)?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

C. Additional Ideas and Comments

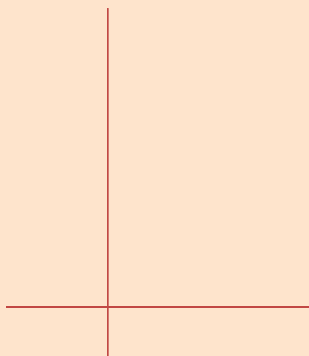
Describe (with a few keywords) what has been the most important changes to you?

In general which changes would you like to recommend?

Which other improvements would you like to recommend?



Any other suggestions?



C.3 ValNet Validation Questionnaire for Educational Establishments

This structured validation tool is the second element of an on-going *validation instrument* for the *management of educational establishments*. The validation tool might again be used as a *questionnaire* to be sent to members of the management or as *guidelines* either *for structured individual interviews* or *for structured group discussions* in case a managerial group is involved.

The following questionnaire should be used at the *end of the project* for the final assessment and/or *after 3-6 month after the end of the project* for a follow-up assessment of the operational performance as well as the services and results of the specific project. Furthermore you will have again the possibility to match your expectations and predictions formulated at the beginning of the project and at half-time of the project with the actual outcomes and impact of the project.

In the following you will again be presented with the *following options to answer to the questions*: (a) open questions, where we would like you to write down your thoughts; (b) tick boxes, where we would like you to mark the most appropriate answer and finally with (c) ratings on a scale from 0 to 5. Number 0 should be chosen when the question is “Not applicable”, 1 stands for “Low” e.g. to be used in case you expect small added value for your school and 5 for “High” to be marked in case of e.g. anticipated high added value.

Basic Description of the School Project

Title: _____

Acronym: _____

Responsible Person at your school: _____

Responsible Person within the project: _____

Start date: _____

End date: _____

Language: _____

A. Validation of Pedagogical Aspects (Teaching & Learning) Remarks

Was it necessary again to change your opinion on the foreseen added value (if yes, please describe below why)?	☐ Yes ☐ No	Why
Where would you finally see the added value of the project for your school (please describe)?		
How would you finally estimate the added value of the project for your school?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you now estimate the usability of the proposed pedagogical approach for your school?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the implemented guidelines and/or qualification/training measures for your teachers?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the effectiveness of the collaborative schemes?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

B. Validation of Organisational/Institutional Aspects Remarks

How would you finally estimate the application of VEMUS or combination of VEMUS applications used within the project?	①-①-②-③-④-⑤ <i>poor</i> <i>good</i>	
How would you finally estimate the location of VEMUS?	①-①-②-③-④-⑤ <i>poor</i> <i>good</i>	
How would you finally estimate the access of learners to VEMUS?	①-①-②-③-④-⑤ <i>poor</i> <i>good</i>	
How would you finally estimate the awareness of teachers and learners participating in the project in terms of VEMUS-based or VEMUS-integrated subject teaching (in comparison to the beginning of the project)?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
How would you finally estimate the familiarity of teachers and learners participating in the project in terms of VEMUS-based or VEMUS-integrated subject teaching (in comparison to the beginning of the project)?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
How would you finally estimate the VEMUS-skills of teachers and learners participating in the project (in comparison to the beginning of the project)?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
Has the number of teachers involved in VEMUS-based or VEMUS-integrated subject teaching (in %) changed again in the meantime?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	

B. Validation of Organisational/Institutional Aspects (cont.)

Remarks

Has the number of teachers involved in coordination of self-learning activities of pupils changed again in the meantime?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
Has the number of teachers involved in innovative learning activities of pupils (e.g. collaborative and/or project-based and/or knowledge-sharing) changed again in the meantime?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
Has the number of learners participating in innovative learning activities (e.g. collaborative and/or project-based and/or knowledge-sharing) changed again in the meantime?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
Has the ratio between school-based and home learning changed again in the meantime?	①-①-②-③-④-⑤ <i>lower</i> <i>higher</i>	
How would you finally estimate the level of knowledge transfer (created within the project) within and outside your school (i.e. external institutions, teachers and learners within and outside, learners at home, subjects, levels etc.)?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the number of dissemination activities of the project within and outside your school (i.e. number of persons/institutions involved, geographical distribution [local, regional, national])?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

C. Validation of Technological Aspects

Remarks

How would you finally estimate the quality of educational solutions developed by the project and/or developed by teachers and learners within the framework of the project?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the integration of newly developed VEMUS solutions in your existing technological equipment (incl. maintenance, updates)?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	
How would you finally estimate the integration of VEMUS-based or VEMUS-integrated teaching and learning into management procedures of your school (incl. responsibilities)?	①-①-②-③-④-⑤ <i>low</i> <i>high</i>	

D. Validation of Economic Aspects

Remarks

How would you finally estimate the integration costs of VEMUS-based or VEMUS-integrated learning and teaching <i>as developed by the project</i> into your traditional procedures: (a) in terms of technological integration? (b) in terms of management integration? (c) in terms of Teacher Training (TT) and Continuous Professional Development (CPD)?	①-①-②-③-④-⑤ low high ①-①-②-③-④-⑤ low high ①-①-②-③-④-⑤ low high	
Have you run a final analysis of the related integration costs (e.g. per unit, subject, teacher, pupil)? If yes, what are those costs? On which basis did you calculate those costs?	☐ Yes ☐ No Costs: Cost basis: _____	
How would you finally estimate the scalability of costs by transferring the project's products/ resources, services etc. within and outside the school (i.e. teachers and learners within and outside, learners at home, subjects etc.)?	①-①-②-③-④-⑤ low high	

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