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Palette

Pedagogically sustained Adaptive LEarning Through the exploitation of Tacit and Explicit knowledge

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Thematic Priority: Technology-enhanced learning

D.EVA.02- The Palette Evaluation Toolset

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Summary

This deliverable elaborates the framework for the validation and evaluation of PALETTE services and scenarios. The structure of this paper is as follows. Section 1 describes the context of and the purpose of this deliverable Section 2 is concerned with outlining the characteristics of the Palette project which have determined the nature of the evaluation and definitions of performance indicator to be used. Section 3 identifies the audience/stakeholders of the evaluation, the form of feedbacks and defines the target groups. Section 4 details the meta-questions underscoring the project and the generic aspects under which specific questions are listed along with the target respondent group and a suggested instrument.

IN	TRODUCTION	4
CE	HARACTERISTICS OF THE PALETTE PROJECT	5
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
EV	ALUATION AUDIENCE, FEEDBACK AND TARGET GROUPS	8
3.1	,	
3.2		
3.3		
EX	VALUATION OUESTIONS	10
4.4		
RE	FERENCES	16
	CH 2.1 2.2 2.3 2.4 2.5 2.6 EV 3.1 3.2 3.3 4.1 4.2 4.3 4.4	CHARACTERISTICS OF THE PALETTE PROJECT. 2.1 The Participants 2.2 What is Palette? 2.3 The PALETTE methodology. 2.4 Main PALETTE design and implementation of services and scenarios actors 2.5 The Levels of the Evaluation Approach 2.6 Principles of Procedure. EVALUATION AUDIENCE, FEEDBACK AND TARGET GROUPS 3.1 Stakeholders in, and audience for, the evaluation 3.2 The Destinations and Nature of the Feedback 3.3 Target Groups. EVALUATION QUESTIONS 4.1 The Meta-Questions 4.2 Types of Indicator 4.3 Generic Indicators 4.4 Core Questions/Indicators

1 INTRODUCTION

The context of this deliverable: IST is:

"European research activities are structured around consecutive four-year programmes, or so-called Framework Programmes. The Sixth Framework Programme (FP6) sets out the priorities - including the Information Society Technologies (IST) priority - for the period 2002-2006." http://cordis.europa.eu/ist/

Palette is a three years Integrated Project (IP). It aims at facilitating and augmenting individual and organisational learning in Communities of Practice (CoPs). Towards this aim, an *interoperable and extensible set of innovative services* as well as a *set of specific scenarios of use* will be designed, implemented and thoroughly validated in CoPs of diverse contexts: teaching, management and engineering.

The PALETTE global organisation breaks down into 9 workpackages (WPs) whose architecture as described in the DOW is illustrated in Figure 1.

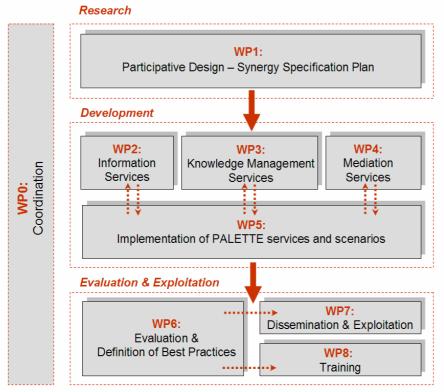


Figure 1: Workpackages architecture.

"The development of innovative pedagogical scenarios and the implementation of the participative design methodology, will take place in WP1 (Participative Design – Synergy Specification Plan), whose outcome will lead the development phase of the project.

WP2, WP3 and WP4 concern development of the three categories of services i.e. information, knowledge, and mediation services.

- Information services refer to facilities offered to produce, reuse and share information issuing from CoPs activities
- Knowledge services refer to facilities offered to generate, use, manage and make use of knowledge associated with CoPs activities.
- Mediation services refer to facilities offered to sustain the CoPs in their collaborative activities and debate about practices.

The implementation of PALETTE services and scenarios will take place in WP5; a central WP dedicated to integrate pedagogical and technological requirements.

WP6 aims at evaluating the outcome of the development phase in real contexts and defining best practices.

WP7 and WP8 respectively tackle the dissemination and exploitation of the project's results and, training activities that will be carried out.

Finally, WP0 coordinates the work to be performed in WP1-WP8, being solely devoted to management activities.

In order to efficiently support communication and collaboration between partners of the project, a number of fundamental choices have been made deliberately:

- Responsibilities of workpackages are jointly shared by two persons, one putting on its pedagogical hat and the other one its technological hat; formally, one is the official WP Leader, the other one is named Deputy.
- A well defined communication structure will be established in which a delegate of the 3 categories of the 10 CoPs initially involved in the project will act as a relay between WP1 and workpackages 2 to 4 to guarantee efficiency of the participative design approach.
- Validation of services implemented in WP2, WP3 and WP4 will be done in WP1; this is to guarantee that validation will not be done in limited contexts and, will take into consideration a combined concern about pedagogical and technical requirements." (Extract of the DOW, Version 1 28 of October 2005, page 52)

The purpose of this deliverable is:

The definition of criteria for the evaluation of the adaptability, accessibility and acceptability of the PALETTE services, in collaboration with WP1. The design of instruments to elicit data and evidence. Eventually, this deliverable will support the training of the evaluators relays involved in each users' group (Extract of the DOW, page 83)

2 CHARACTERISTICS OF THE PALETTE PROJECT

2.1 The Participants

In common with other IST/IP projects, the participants in PALETTE are drawn from several countries and represent both academic/research institutions and the private sector. The goals of the project oriented towards the development of knowledge and services on and for the – so called - communities of practices as well as the participatory design methodology imply that COP's will also be considered as actors in the development of the R and D project. Their voices and interests are of important value.

2.2 What is Palette?

The evaluation of PALETTE is complicated by the fact that there are differing operational interpretations of PALETTE amongst members of the project. At this stage, we can identify certain characteristics and dimensions of the PALETTE approach. These include, in no order of priority:

- **1. PALETTE development** is focused on the development and uses of technological interoperable services
- **Interoperability** must be understood as interoperability between services AND with the tools and services in use in the CoPs

"In this sense interoperability of services is a notion that encompasses both technological and operational capabilities.

Technological capabilities mainly concern the development of services that may be connected to other ones and, may exchange pieces of information. Interoperability issues are thoroughly explored in the software engineering domain and, it is commonly accepted that the adoption of a number of standards as well as the explicit specification of APIs (Application Program Interfaces) bring a significant contribution to the technical issues.

Operational capabilities address the issue of enabling services to operate effectively together. This issue is much more complex because the targeted operational environments are "moving grounds" whose characteristics highly depend on several factors such as the domain of activity of a CoP, its members' profile, specific organizational aspects, technical constraints, etc.

The PALETTE project aims at providing services to be adopted by a wide range of CoPs; in this purpose, the palette of services to be provided need to be generic and, accommodate features, that may drastically differ from one Cop to another.

The activity domain of a CoP has an influence on the nature of information to be dealt with (for instance, CoPs in the engineering domain clearly require appropriate management of mathematical data). The CoPs members' profile may be related to CoP categories (the potential adoption of new tools by CoPs members depends on the maturity of the CoP; a well established CoP, for instance, making use of common set of tools for a while, is likely to be more reluctant to the use of new tools if the effort to combine them with existing ones is too important) CoPs are potentially organized in very different ways, ranging from a network of quite unstructured collectivities to organized entities that are issuing guidelines to sustain activities and communication framework within the CoP (constraints to achieve a given interoperability level will be different from case to case). Finally, technical constraints may be indirectly imposed by CoPs and, affect the implementation of services (members of a CoP, for instance, may be particularly mobile and, thus requiring adapted functionalities that covers features such as the use of mobile devices, the use of a limited bandwidth, etc.) (Extract of D.IMP.01.)

Services

Taking into account the targeted level of interoperability, we may summarize the concept of PALETTE services in the following way:

"PALETTE services to be provided to Communities of Practice (CoPs) are dedicated to a common global objective: enhance the effectiveness of collaborative learning process of CoPs. They have to be connected in such a way as maximizing exchange, reuse and sharing of information and knowledge between members and outside the CoP. They have to sustain collaborative interactions in accordance with the evolution of CoPs members' practices and environments." (Extract of D.IMP.01.)

This approach of PALETTE services means that often only some functionalities (and not all) of the tools developed would be in use by a CoP.

- **2. PALETTE research** is focused on the development of knowledge about learning and building knowledge in CoPs;
- **3. PALETTE research** is focused on addressing the challenges of the development of interoperable services, usable, acceptable and adaptable.
- **4. PALETTE research** is focused on the development of new CoPs practices enhanced through the uses of PALETTE services;
- **5. PALETTE research** is focused on the development and experimentation of a participatory design methodology;
- **6. PALETTE dissemination of results** would be realized through an Open Sources strategy.

2.3 The PALETTE methodology

PALETTE methodology is participative. A participatory design methodology has been designed (D.PAR.01.). Based on short steps including efforts of all the actors (human and non human), this methodology is iterative and aims at developing and adopting relevant and useful services and scenarios. Validation is part of this methodology. It is included in the PALETTE R & D sub processes as a transversal process that happens regularly all along the project and influences the other processes. The Enabling-Process-Outcomes timing of the collection and analysis of data is consistent with this formative role of validation.

2.4 Main PALETTE design and implementation of services and scenarios actors

At the heart of the project are the developers-CoPs working groups coordinated by the WP5 in which participatory design activities are taking place. These developer-Cop working groups are cross cutting.

"Three cross cutting working groups (named Team-A, Team-B and Team-C) have been set-up to facilitate the flow of crucial information and exchange between the R and D WP (1, 2, 3, 4 and 5) and the coordination of activities.

Two main issues are addressed through this approach:

- Interoperability: this approach will allow addressing interoperability between services. In each group two service-developing teams approach the Cops together. Surely all pairs of services are possible, but some profit especially well from each other in the initial state of scenario.
- Specific and more general scenarios: each group should address two Cops and negotiate two specific scenarios. With the integration of both a more general scenario can also be created." (Extract of D.IMP.01.)

The validation process will be realized through and with the close collaboration of these working groups coordinated by the WP5. In parallel are the complementary activities of evaluation (Workpackage 6), educational research (Workpackage 1) and dissemination (WP7) and training (WP8).

2.5 The Levels of the Evaluation Approach

Because the internal structures of the PALETTE project itself, the evaluation approach operates at three levels:

- Level one: is oriented towards the formative evaluation of the project itself and is not the purpose of this document. For this level see the D. EVA.01
- Level two: is oriented by the particular concerns of the PALETTE R and D project and will focus on any generic processes which characterize participatory design activities in each of the developers-Cops working groups.
- Level three: this is oriented by the evolving requirements of each of the three developers-Cops working groups and is essentially oriented towards testing and validation of scenario and services.

Levels three is mainly addressed by this framework.

2.6 Principles of Procedure

The overall tone of the evaluation is embodied in four principles of procedure, characterized by the following headings:

Collaborative: We will work closely with the developers-CoPs working groups which constitute the strong relations with CoPs partners. This includes the generation of indicators and the development of procedures.

Integrated: We have adopted a methodology which integrates the evaluation over participatory design time phases and across the developers-CoPs working groups. Whilst recognizing specificity of each team and CoP, we intend there to be a core of evaluation activity and a framework common to all.

Formative: We intend there to be a high level of feedback of evaluation findings to developers-Cops working groups and CoPs. This will occur at important phases of the participatory design process.

Independent: To integrate an independent stance to the validation, the data analysis will be collected with the support of so called "external validators". External validators are partners of the project who are not directly involved in the scenario and services design and development.

3 EVALUATION AUDIENCE, FEEDBACK AND TARGET GROUPS

3.1 Stakeholders in, and audience for, the evaluation

The overall evaluation is intended to serve the needs of five main groups:

- 1. **Participants in the developers-CoPs working groups:** to serve a formative function by providing an independent source of information on the services and scenarios developed
- 2. **CoPs members** to serve a formative function by providing an independent source of information on the learning practices developed
- 3. **PALETTE members** concerned with dissemination: to provide information which can be used to explore and design ways in which PALETTE may be exploited as an approach on a wider stage.

- 4. **PALETTE members concerned with training** to provide information which can be used to explore and design training activities.
- 5. **The wider 'learning community'** interested in how opportunities for learning in CoPS might be enhanced and supported.

3.2 The Destinations and Nature of the Feedback

Feedback may range from informal verbal feedback (i.e., to CoPs) to formal reports-to other stakeholders (e.g. PALETTE partners). Content of the feedback will be at three levels:

- 1. Focused on specific CoPs and/or domains (teaching, engineering and management).
- 2. Specific recommendations/changes which are relevant to specific CoPs or domains but can be generalized to a wider context.
- 3. Meta-level syntheses that is, statements about the nature of services and scenarios and methods concerning PALETTE.

All the feedbacks will be recorded to be reported and analyzed.

3.3 Target Groups

We see the following as potential target groups, the practices and experiences of which will form the main evidence for the evaluation.

- CoPs participants members;
- CoPs' Moderators (person or group of persons who is in charge of the animation of the group);
- CoP's delegates (person designated by a CoP to represent the group);
- Technical resources persons in CoPs.
- Developers-CoPs working groups members (P and T) especially members in charge with the CoPs relations (the so called mediators).
- Developers-Cops working groups coordinators
- Independent experts

We understand that CoPs or domains might not designate roles to individuals using the above suggested titles. We propose, therefore, that evaluators adopt the following procedure:

- 1. Use as a starting-point the roles as defined in this proposal.
- 2. Ask actors who have been designated roles to state their understanding of these roles.
- 3. On the basis of 1 and 2, develop a new grounded typology.

As a general rule, in the body of the toolset, we use the term *actors* to denote participants in the evaluation.

4 EVALUATION QUESTIONS

The evaluation framework has four levels.

- The first underscores the evaluation and is composed of 9 *meta-questions* which constitute primary 'focusing' concerns for the developers-CoPs working groups. They have been derived from participant/evaluator discussions particularly with the WP1 participants. Their function is to aid the overall project in addressing the general value of the Palette services and scenarios and acting as an analytic framework. The WP1 team will make reference to them when the reports on the validation of services and scenarios are written.
- The second level is in the form of a series of *generic indicators* each of which will have,
- At the third level, *specific indicators* associated with them.
- Finally, *specific questions* will form the basis of the inquiry instrument which has been designed for each specific indicator. It is the data collected from the specific indicators that will inform the meta-questions.

4.1 The Meta-Questions

What is the validity of the services and scenarios?

Internal validity

- 1. Is the scenario or service valid regarding its objective/the community's need or project that it is supposed to take into account?
- 2. Is the scenario or service complete? Are some aspects missing to fully express the need? Is the scenario or service not too redundant?
- 3. Is the scenario or service consistent? Are the proposed activities, steps and uses consistent together?
- 4. To what extent has the community participated in the elaboration of services and/or scenarios (distributed participative design)?
- 5. Is the scenario or service realistic (or "credible") regarding:
 - o the technical skills of the community's members and their social competencies or usual ways to communicate and collaborate?
 - o the actual uses of tools in the community?
 - o the actual types of activities and the actual functioning of the community?
 - o the objectives of the community and of its members? Is it representative of the objectives of the community as a whole?

External validity

- 6. Is the scenario or service easily reproducible ("re-adaptable") for other types of communities? Is it easily modifiable and open?
- 7. Is the scenario in line with the Palette project's objectives and with the D.PAR.02 guidelines?

Pragmatic validity

- 8. Do Palette services achieve a right level of interoperability, usability, utility and acceptability?
- 9. What are the actual uses of the PALETTE services and scenarios? (Communication practices, problem solving, knowledge building, learning)

4.2 Types of Indicator

The concept of an indicator is not straightforward. It is helpful to understand them in the following way with three 'modes' of use.

Mode 1: **Indicators interpreted as the evidence focus** (i.e., areas, activities, domains or phenomena on which evidence will be collected).

[Indicators as a focus]

Example: the area of student achievement in assessment is identified in advance in an evaluation plan as an area on which data will be gathered

Mode 2: Indicators interpreted as the evidence itself

[Indicators as the evidence]

Example: actual student achievement data or results are identified 'post hoc' [this is the important difference to mode 1] as indicators of the performance of an intervention

Mode 3: Indicators as pre-defined or prescribed states to be achieved or obtained. In this way indicators constitute desired outcomes.

[Indicators as prescriptions of good performance]

Example: grade C or above passes in national examinations are prescribed in advance as an indicator of good performance. Evaluation focuses on the 'gap' between actual performance and prescribed performance.

Within the PALETTE project, we suggest predominantly using mode 1 indicators i.e. an indicator is an area or aspect of the project on which data and evidence will be collected. It is essentially using a series of descriptive categories. What is important to note is that they are not mode 3 indicators, i.e. indicators that are 'normative' but analytic/descriptive.

The plan suggests the timing of the evaluative activity in line with whether it is enabling, process or outcomes. This framework does have a 'temporal' dimension in that enabling indicators (see below) are likely to be the focus at the 'front-end' of a project, the process indicators are usually used in the middle stages and the outcome indicators are left to the latter stages or after the project ends. These foci therefore do have a logic that depends on when it is sensible or feasible to look for different types of project characteristics.

This model identifies the following definition of enabling, process and outcome mode 1 indicator:

Figure 1: Types of [Mode 1] indicators

Enabling	Process	Outcomes
Aspects that need	Actions	Goals
to be set up	Ways of doing things	What you want to see as a product
Frameworks for action	Styles	Services
Policies	Behaviors	Numbers
Protocols	Practices	Impact
Space		Changes
Time		New practices
People		
Resources		

4.3 Generic Indicators

A list of generic evaluation headings have been derived from discussions amongst members of the evaluation team. See such headings below

ENABLING:

1. PREPARATION AND EXPECTATION

PROCESS:

- 2. ENABLING OF LEARNING
- 3. PARTICIPATION
- 4. ENABLING OF KNOWLEDGE BUILDING AND REIFICATION
- 5. ENABLING OF GOALS REALISATION

OUTCOMES:

- 6. STATES OF KNOWLEDGE
- 7. NEW PRACTICES
- 8. EFFECTS ON INSTITUTION/ORGANISATION
- 9. INTEROPERABILITY, USABILITY, ACCESSIBILITY AND ADAPTABILITY

4.4 Core Questions/Indicators

The Core Questions and indicators will be derived from the generic indicators. See for each generic indicator the following examples:

1. Generic indicator: Enabling

Specific Indicator: preparation and expectations

Questions

- 1. What are the perceptions of the Palette's scenario aims and objectives by the communities?
- 2. What are the perceptions of the community about the understanding of their needs by the Palette developers?
- 3. What are the perceptions of the community about the process of elaboration of the scenario which is made explicit in the scenario?
- 4. Are the protocols easily understood?
- 5. Is the form of the scenario suitable and understandable by the community?

Target Group: Delegates or focus groups from the communities

Instrument: Group discussion

Semi-structured interviews

2. Generic indicator: Process

Specific Indicator: Enabling of learning

Ouestions

- 1. What the conditions that best support learning in CoPs (sociability, social links) and how are they fulfilled?
- 2. How do the PALETTE services and scenarios support these processes?
- 3. What kinds of institutional factors influence the scenario (policies, space and resources)?

Target Group: Delegates or focus groups from the communities

Instrument:

Group discussion

Semi-structured interviews Analysis of on-line discussion

3. Generic indicator: Process

Specific Indicator: Participation

Questions

- 1. To what extent do all the actors of PALETTE participate in the scenario and services building?
- 2. How are the participatory activities perceived?
- 3. Is it possible to identify 'participatory' practices?
- 4. What are the factors that are most supportive of participatory practice?

Target Group: Delegates or focus groups from the communities

Instrument:

Group discussion

4. Generic indicator: Process

Specific Indicator: Enabling of knowledge building and reification

Questions

- 1. What factors are conducive to capturing and building knowledge?
- 2. Are the knowledge produced useful, and for whom?
- 3. In what ways are reified knowledge used?

Target Group: Delegates or focus groups from the communities

Instrument: Analyze of the uses of the Knowledge Management services Group discussion

5. Generic indicator: Process

Specific Indicator: Enabling of goals realization

Questions

- 1. Does the use of PALETTE services and scenarios support the achievement of CoPs' goals and how?
- 2. Were PALETTE services and scenarios adapted for the achievement of specific goals?
- 3. Was the wider institution aware of the role of PALETTE services and scenarios in achieving the CoPs' goals?

Target Group: Delegates or focus groups from the communities

Instrument: Group discussion

6. Generic indicator: Outcomes

Specific Indicator: States of knowledge

Questions

1. What are the new knowledge and skills developed by all the PALETTE actors? (human and non human)

Target Group: PALETTE partners, Delegates or focus groups from the communities

Instrument: Group discussion, analysis of the scenario and services provided

7. Generic indicator: Outcomes **Specific Indicator**: New practices

Questions

1. What are the new practices developed by the CoPs and their members? (human and non human)

- 2. In what ways are the new knowledge and skills manifest in changed practices at individual level?
- 3. In what ways are the new knowledge and skills manifest in changed practices in groups?

Target Group: Delegates or focus groups from the communities

Instrument: Group discussion, interviews, analysis of on-line exchanges

8. Generic indicator: Outcomes

Specific Indicator: Effects on institution and organization

Questions

- 1. How is the institution or organization related to the CoP impacted?
- 2. In what ways are the new knowledge and skills manifest in changed policies?
- 3. In what ways are the new knowledge and skills manifest in changed systems?

Target Group: Delegates or focus groups from the communities

Instrument: Group discussion, interviews of members and non members

9. Generic indicator: Process and Outcomes

Specific Indicator: Interoperability, usability, accessibility and acceptability

Tricot et al. (2003, p. 394) propose a framework for the evaluation of these three quality dimensions in the field of the development of systems for learning. We adapt in the table 1. below the framework and indicators for PALETTE services and scenarios validation.

	Empirical evaluation (by global observation)	Systematic inspection by an expert
Utility	 Appropriateness of the system's declared objective to the achieved objective Appropriateness of the community's declared objective to the achieved objective Can be measured by organizing different tasks with the users: Production Detection of errors Reminder of the contents/structure Resolution of users' problems 	 Indicators: Presentation of the system's objectives Appropriateness of the functionalities to the objectives Appropriateness of the suggested scenarios to the objectives Regulation and feedback opportunities
Usability	 Help or demo of the system for the user Management and prevention of errors Memorization of the functioning by the user Efficiency Feeling of satisfaction Can be evaluated by observations, interviews or analysis of traces at different levels (members, animators, community as a whole) 	 Indicators: Guidance Grouping/Distinction of the items/menus Nature of feedbacks from the system Workload Explicit control Adaptability Management of errors Quality of messages Homogeneity and consistency Meaning of codes and labels
Acceptability	 Motivation Affects Culture Values Cost Can be evaluated by observations, interviews or questionnaires.	Appropriateness to: Needs or objectives of the community Expectations of the users Characteristics of the users Compatibility with: Organization of community's time Organization of community's place of work/meeting Clear and consistent planning Visibility and communication of the results Reliability

Table 1: "Framework for the evaluation of interoperability, usability, accessibility and acceptability"

Regarding the evaluation of the interoperability, D.IMP.01 has provided clear guidelines (pp. 4-5). The notion encompasses both technological and operational capabilities.

Technological:

- Interconnection of services (exchange of pieces of information)
- Acceptation of standards
- Acceptation of specification of APIs (Application Program Interfaces)
- Consideration of users' needs and objectives in order to precise the functionalities

Operational:

- Consideration of different communities' profiles (domain, organizational aspects, etc.)
- Consideration of different members' profiles (member, animator, etc.)
- Consideration of technical constraints (software, servers or OS already used by the communities)

The inspection by an expert will be namely realized through a specific task suggested in the next work plan of WP1 by ULG.

5 REFERENCES

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