“The Conceptual Pond” is an application for assessment designed to gather qualitative input through an intuitive, visual interface. The process of using the application serves as a conceptual aid for personal reflection as well as providing an evaluation system with the ability to transform this input into quantitative data. The application thus serves three distinct yet parallel purposes:
1. One of assessing and evaluating through an interface designed with a focus on intuitive handling, visual language and facilitating input of a qualitative nature.
2. One of processing such assessment of qualitative input so it is transformed into quantitative, comparable representations.
3. One of supporting learning, reflection and immersion through agency in a digital environment.

The Conceptual Pond is developed as a response to challenges of evaluation related to the EuroPlot-project (an EU-supported research project under EACEA), in particular the Kaj Munk Case, focusing on the dissemination of biography, works, and impact history of Danish vicar, journalist, and playwright Kaj Munk. The application is designed implementing persuasive principles (Fogg, Oinas-Kukkonen et al.), learning taxonomies (Biggs & Tang, Bloom) together with a rhetorical understanding of kairos.

This paper includes the evaluation of several use cases as well as two modifications to the original application design supporting pre-literate children as well as implementing a temporal perspective to application functionality.

**Keywords:** Conceptual Pond, persuasive technology, assessment, intuitive

**Introduction**

In Western societies (and most other societies) it is the prevailing order that most learning is done within the framework of an organized school system. Teaching a curriculum through various methods shapes the knowledge and reflection of pupils and students. Progress in the field of reaching intended learning outcomes are usually monitored through exams, tests, and assessments. (Biggs & Tang, Bloom) Despite of changes in pedagogical method and learning designs the dichotomy and interaction between learning and assessment is stable. Even if grading is not an issue the mere evaluation of learning is necessary for the planning of future learning events by the educator.

In a number of contexts, however, formal evaluation in the shape of exams and tests are a less viable option. Much learning is done, insights gained and reflection facilitated in a number of less patterned learning environments (Falk, Hooper-Greenville). In the area of cultural mediation learning is only partly consistent with the formal education system. It is often based on casual interest, fragile preceding knowledge and fluctuating attention. So, in cultural mediation or pedagogical work with small children for example, another approach to learning and assessment may be appropriate.
Development of The Conceptual Pond has been made in order to facilitate the gathering of input of a complex nature such as impressions, reflection, opinions, and less categorized knowledge. These are gathered through a simple interface with an emphasis on overview, intuition and interface tangibility.

At the same time this diverse input is compiled in the application and is transformed into generic data suitable for data presentation and cross tabulation thereby transforming qualitative data into material suitable for quantitative analysis. The intention has been to develop an assessment tool shaped to fit the interests and expressions of the users rather than fitting these interests into too firmly predefined frameworks. User adaptation is supported by the interactivity of the digital format.

This paper serves to present a pilot study of The Conceptual Pond and the theoretical framework behind it as well as suggesting areas for further research.

The Conceptual Pond is designed to solve tasks primarily in the field of learning, social sciences and human sciences. The theoretical background and functionality however makes it no less relevant in other sectors such as human computer interaction, psychology, or social sciences. The need for analyzing humanly expressed thoughts is central in a broad variety of academic, pedagogic, cultural or societal projects. Use cases referred to in this paper should demonstrate this applicability in several environments.

**Background**

The Conceptual Pond is originally developed to meet challenges of evaluation in the environment of the EuroPlot-project (an EU-supported research project under EACEA). Part of this project has a focus on the provision and dissemination of cultural content. The Kaj Munk Case has been explored by Aalborg University and the Kaj Munk Research Center. Kaj Munk (1896-1944) was a leading Danish theologian, playwright, journalist and writer. His works comment the political and philosophical issues of his era as well as discussing existential and religious subject of the modern paradigm. Kaj Munk also contributed substantially to Danish WWII history by being executed by German authorities in 1944 for his nonviolent resistance to the German occupation. Ideas from Kaj Munk were inspirational for the implementation of truth committees in the South African reconciliation process after apartheid, thus proving the heritage of Munk to be relevant in a history of impact.

Due to the complexity of the content of this cultural mediation several approaches have been made providing digital learning material content (Hansen, Hansen, Sørensen, Øhrstrøm 2013). Archival access is facilitated through The Munk Study Edition (Petersen & Øhrstrøm) offering fully searchable annotated texts of Munk’s plays and sermons. The application is based on an EMDROS-database (Petersen 2004) The Munk Study Edition is supplemented with GLO’s (Generative Learning Objects) (Hansen, Hansen, Sørensen, Øhrstrøm 2013). Working with these multimodal learning processes raised the attention to the need of acquiring valid feedback of not only knowledge but also interpretation and impression. For this reason The Conceptual Pond was designed in cooperation with Mathias Grund Sørensen (Sørensen & Sørensen).

**Persuasive assessment**

As mentioned in the introductory remarks assessment is a consistent part of most common theories of learning. In the neoclassic understanding of cognitive domain in Blooms Taxonomy (Bloom) assessment is a vital part. In the Structure of Observed Learning Outcomes Taxonomy of Biggs (Biggs & Tang) evaluation and assessment play an equally important role – emphasizing the importance of
observation in the term “Observed Learning Outcomes” of the SOLO taxonomy. In the Anglo-Saxon learning paradigm to which the two learning theories belong assessment plays a more dominant role than in Scandinavian school tradition. However, since evaluation is an integrated part of contemporary educational practice. It is necessary also for the EUROPlot-project to develop and present suitable assessment tools for the evaluation of the individual student/users as well as groups. Nevertheless, as Odendahl points out: “Abstract principles have to be translated into real tests for real students … “How” decisions include question format: selected-response tasks, in which the student selects from among answers that are provided on the test, or constructed-response tasks, in which the student generates a product or performance.” (Odendahl, 2011, p. 8). The process is in casu assessment related to the Kaj Munk Case of a two-step nature (Rossman & Rallis):

1. The gathering of valid qualitative input.
2. The adaptation of these data into an environment suitable for further analysis.

The first part of this two-step model implies the motivation and persuasion of the learner to take part in the process of assessment. In a regular school system at any level this may often be a minor challenge. Moving into the area of cultural mediation users usually feel less obligation to take part in surveys etc. This calls for another motivational approach than the Benthamian concept of the omnifocal Panopticon in which prisoners were subject to assessment in the shape of surveillance. The Panopticon is used also as a societal metaphor by Michel Foucault (Foucault, 1977; Jespersen et al. 2007). Perhaps a third aspect needs to be added to the Rossman & Rallis approach:

3: The implementation of qualitative input into a persuasive process for enhancing reflection.

Tools and principles for meeting this challenge may be found in discourse in the field of persuasive technology. The basic discourse in the persuasive technology field is rooted in the research of behavioral psychologist B.J. Fogg. In his book “Persuasive Technology – Using Computers to Change what we Say and Do” he combines observations in the human computer interaction field with a psychological understanding offering a number of methods or devices to persuade the user into adapting a certain attitude or behavior “without coercion or deception” (Fogg, 2003). Many of the “classic” persuasive devices of the 2003 book require a certain kind of monitoring, assessment or feedback to function as intended. This also applies for Fogg’s persuasive tools, namely tailoring, conditioning, reduction (to some extent), and in some cases also tunneling, and suggestion. These persuasive devices most often function with the assistance of interactive feedback that allows for proactive agency decided by the feedback of past choice, such as product recommendation systems utilizing past user purchases.

<table>
<thead>
<tr>
<th>Device: Surveillance</th>
<th>Peer comparison</th>
<th>Self-monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Panopticon</td>
<td>CCTV Exam</td>
<td>Endomondo (1)</td>
</tr>
<tr>
<td></td>
<td>Endomondo (2)</td>
<td>Educational games</td>
</tr>
</tbody>
</table>

Assessment and evaluation is often at the center of technologies related to self-monitoring and surveillance (Oinas-Kukkonen). In Figure 1. the role of assessment in Persuasive Technology is defined as an axis with three elements: Surveillance, peer comparison, and self-monitoring. A not very benevolent interpretation could be to make a parallel between surveillance and assessment in the shape of exams and tests. This may be partly true. At the same time peer comparison is an important factor in educational assessment systems, and even the element of self-monitoring is vital part of the motivational process for the individual student. The pinpointing of exams to one single point at the axis is therefore reductionist. The examples may be pinpointed differently on the surveillance - self-monitoring axis depending on the actual use. Therefore
Endomondo, the sports tracker, is also pinpointed as (1) or (2) depending on what features are used in the app. If the tracker is applied only for personal individual use it supports and motivates through self-monitoring. Once results are shared on social media a more or less voluntary submission to surveillance is accepted.

In the Persuasive Technology field such dynamics are heavily discussed, especially in the areas of health-care and prevention. A classic example is Fogg’s heart-rate monitor (Fogg). In an extended form it plays a role in studies of persuasive motivation (Munson, Lauterbach, Newman, and Resnick) where the role of assessment is linked with a social network site in order to benefit from the persuasive power of social comparison and peer support. Another example is the studies of weight loss websites by Lehto and Oinas-Kukkonen (Lohto & Oinas-Kukkonen). They underscore the worth of assessment in the context of social facilitation, which is closely related to self-monitoring and social comparison.

**Kairos**

In several aspects the ancient rhetorical concepts are helpful in designing with persuasive intent (Hasle). Bringing the concept of kairos into play in a postmodern paradigm facilitates a three-dimensional view to the potential of The Conceptual Pond. Reaching kairos is the art of designing and applying technology at:
1. The opportune time
2. The opportune place (locationary or virtual)
3. The opportune manner (also medium)

This suggests an ecological approach focusing on adaptable systems design suitable for any learning environment. The Conceptual Pond facilitates the implementation of all three aspects of kairos.

From a perspective of reflection it is imperative that some acts of evaluation are carried out immediately after receiving the impression. In the use case of the teenagers evaluation of impressions from viewing the Kaj Munk play, they still had the experience in vivid memory when accessing the survey. Since TCP is part of technology enhanced learning and is available at all kind of online devices it may be used at any given time. Another aspect of kairos is the time elapsing carrying out a task. In relation to this it is promising that tests displayed response times between 95 and 140 sec. on average which appears considerably less time consuming than comparable questionnaires.

Since learning and reflection takes place in a number of environments it is imperative that the evaluation system may be available everywhere. This is the case since The Conceptual Pond is itself everyday in the sense that technology allows for it being used even in the open country by the Kaj Munk Vicarage Museum, at a kiosk at the library or at a school computer. The third aspect of kairos refers to the function and characteristics of the system itself. Does it offer content in a contextually relevant way? In relation to The Conceptual Pond the question primarily is one of mediation. As shown in the use cases the choice of technology and mode proves to be convincing. Apart from the few motorical problems handling a non-touch device the system seems fully sustainable. Using The Conceptual Pond should facilitate reflection and assessment in a helpful way thus mediating in the opportune manner.

**The Conceptual Pond**

On the basis of these insights from the areas of learning and Persuasive Technology the conceptual Pond is designed as an intuitive, visual interface for assessment. Depending on use TCP facilitates a type of qualitative assessment which may be relevant at any point of the axis of Figure 1. On the other hand it is obvious that the complexity of the possible input from
users makes it less helpful for the rather more simplistic answers that will usually be collected in a multiple choice test.

The Conceptual Pond is designed with a simple graphical interface. This is important, as the application should be intuitive and easy to navigate even for primary school children and the technologically challenged. Navigation is a simple drag-and-drop movement and the user is always able to alter her choice and change position of the marker. The user has the command of a number of markers, each of them marked with a word or a short sentence. The user can insert non-pre-designed words of her choice thus extending her expression (if this is not prohibited in the evaluation set-up). Unused markers stay in the right side of the screen, unless the user chooses to leave them otherwise. The markers are clearly marked as moveable boxes and have a clear inscription of the corresponding word. In special situations the markers could be substituted with pictures, colors or symbols as previously mentioned.

The left and center part of the assessment screen is dominated by a circle of relevance. This circle of relevance marks the area in which the words relevant to the user, describing her denotations and connotations related to the subject, are dragged and dropped at will. The center of the circle of relevance is a marked in a clear color fading slowly into a lighter color. The position relative to the center signals the strength and importance of the expression. Using gradients of the colors green enhances the intuitive impact of the interface. As noted in research (Ham & Midden) the colour green is intuitively recognized as something positive and thereby reduces the cognitive load of the user.

**Figure 2. The Conceptual Pond (simplified)**

![Image of the Conceptual Pond](image)

Figure 2. shows a simplified example of the use of The Conceptual Pond related to the Kaj Munk Case. Results of actual use case presented below.

**Use cases**

The Conceptual Pond has been implemented at a number of tests. One of these tests (Ex 1: Reception of Munk’s play “The Word” “The Word) is presented in detail.
Table 1. The Conceptual Pond full-scale testing

<table>
<thead>
<tr>
<th>Ex</th>
<th>Period</th>
<th>Number</th>
<th>Participants</th>
<th>Place</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>October 2012</td>
<td>23</td>
<td>Confirmation class 13-14 y.o.</td>
<td>Church House Nørager</td>
<td>Reception of Munk’s play “The Word”</td>
</tr>
<tr>
<td>2</td>
<td>November 2013</td>
<td>25</td>
<td>Library users 8 – 76 y.o.</td>
<td>Mun. library Nørager</td>
<td>Satisfaction and interests at library</td>
</tr>
<tr>
<td>3</td>
<td>March 2013</td>
<td>40</td>
<td>Philosophy Students</td>
<td>Aalborg University</td>
<td>Reflections on Munk’s play “Love”</td>
</tr>
<tr>
<td>4</td>
<td>April 2013</td>
<td>29</td>
<td>Various adults attending Easter on</td>
<td>Internet survey Denmark</td>
<td>Reception and reflection on Easter on Facebook-project</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Facebook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>June 2013</td>
<td>83</td>
<td>Various adults attending Danish</td>
<td>Aalborg Conference Center</td>
<td>Opinions on important subjects in Church</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Church Days</td>
<td></td>
<td>communication</td>
</tr>
<tr>
<td>6</td>
<td>2013</td>
<td>25</td>
<td>Preschool children</td>
<td>Kindergarten</td>
<td>Testing TCP featuring images instead of text</td>
</tr>
<tr>
<td></td>
<td>planned</td>
<td>approx</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Kaj Munk: The Word

A group of 23 teenagers (13-14 years old) viewed a selected scene of the play “The Word” by Kaj Munk (1962) in a well-known 1955 movie adaptation of Carl Th. Dreyer. The movie was rewarded the Golden Lion Award at the 1955 Venice Film Festival. Despite an antiquated visual language featuring slow dialogue and black/white aesthetics the scene of the resurrection of a woman deceased in childbirth proves to be very moving and is an iconic moment in Danish dramatic tradition.

Question was, however, how would this group of teenagers react to the screening? What are their impressions and reflections? At the same time it was vital not to influence the participants in the survey. Immediately after the screening the teenagers were given a very brief introduction to The Conceptual Pond (2 minutes). Remaining in silence they accessed the system individually contributing with their observations and reflections. The interface was accessed on a laptop PC similar to devices used at school thus eliminating cognitive stress in operation. The laptop was placed in a kiosk setup with the screen turned away in order to secure privacy of the users and avoid possible peer pressure that could bias the results. Each of the 23 teenagers initiated their session filling out a few pieces of generic information (name, gender, age). Subsequently all contributors accessed the interface and reported their impressions to the system.

This process was monitored from some distance to respect privacy and at the same time record the time lapse. Average operating time was 105 seconds ranging from 25 seconds to 180 seconds. All participants except 2 performed between 75 and 135 seconds. Only one user displayed any hesitation in using the system. None required additional instruction. All 23 participants explicitly preferred The Conceptual Pond to a paper questionnaire. 9 users had specific comments. 2 suggested minor changes in design. 7 applauded the user freedom compared to other evaluation methods (such as questionnaires and qualitative interviews).
Results of the results of the teenagers were transformed from quantitative expressions to qualitative data. Production of graphic was done instantly in TCP-application.

Development: Implementing temporal sequence

In a number of contexts a temporal sequence assessment may prove useful. The linking of several proceeding psychological tests may be an example (Sørensen & Sørensen). Development in psychological evolution may be stored and analysed through the system. In a dynamic understanding of kairos this would entail the opportune moment turning into several opportune moments linking together in kairos.

Development: Adaption to the illiterate

Recognizing the needs of children and other illiterate people markers may be exchanged by images or pictograms. In a pedagogical analysis situation as an example markers describing everyday situations with words may be exchanged by pictograms. Placing the pictogram into the circle of relevance at a desired position may be a valid expression of trust or anxiety in a given situation. Implementing a visual language may also benefit literate users of certain cognitive styles (Riding & Rainer).

Conclusion

Applying the Conceptual Pond to appx. 200 people in quite different contexts with quite good results and good feedback allows the conclusion that The Conceptual Pond is a helpful tool. It facilitates easy and intuitive gathering of – often complex – qualitative information. It facilitates easy quantification and instant access to this data as well as making it possible for further cross tabulation. The greatest experience working with The Conceptual Pond has actually been the expressions of the users in relief that the design is intuitive and not another complex questionnaire-based survey. Recognizing the number of agents using questionnaires it is not surprising that a certain fatigue builds up which may also damage the acquisition of valid data. Nevertheless a the development and refinement of the conceptual

Further research
Testing so far of The Conceptual Pond has pointed to it being persuasive, easy to use, and helpful in the acquisition of qualitative data. Nevertheless TCP needs to be tested further refining the interface design to support clear user expression and secure assessment does not facilitate any kind of bias.

Avery promising field is the area of tailoring TCP for certain assessment goals.

Another promising field is the implementation of a temporal flow in assessment, as well as creating a fully functional interface for illiterates, children and the handicapped.

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