Quality-of-Life-Monitor for Sustainable Urban Neighborhood Development – a Boundary Object to Promote Learning in a Regional Multi-Actor Network

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Title
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Reference

Key Words
Foreword

In the sixties and seventies, the general public was mobilized on many issues. Issues that were debated on the street, in living rooms, during assemblies, concerts, manifestations and so on. Opinions were shaped in dialogue and many changes were brought about. The agenda was broad, ranging from individual freedom, via race related issues and environment to help for developing countries and putting a halt to war. In hindsight, we now call this type of learning, reaching consensus and taking influence a bottom-up approach.

The eighties have seen a professionalization of NGOs – groups that represent the opinion and have the support of population segments. They could be considered the non-governmental representatives of these segments. This has resulted in a movement toward reducing the role of the general public to one of concerned bystander (Læssø, 2008). Through the years the NGOs have developed to a point where they are now welcome and respected partners at many influential negotiation tables. Next to mobilizing volunteers and other interactive efforts, they have started to educate the public. Rather than taking part in the debate, the public has increasingly become a receiver of “ready-to-digest” information – a top-down approach.

The last decades have started to show that the development which was so hailed in the post-WWII period did have consequences. It has been shown beyond doubt that our current path is unsustainable. Sustainability issues though are not easy to point at. Problems relating to climate, acidification, air pollution, food-production and many other manifest themselves on a scale that is invisible for many. It has the potential to make people feel hopeless with respect to their own efforts – even if you reduce your personal “footprint”, what good will it do in the big picture. With such a mindset, the general public is less likely to act upon information received – skepticism might prevail.

Sustainability is not something you are “for” or “against” as many of the issues in the sixties were. It is not a matter of shipping food to people in need or forcing boats to stop killing wales. Sustainability involves lifestyle changes – not only in the way public life is organized, but also at a personal level. These lifestyle changes involve choices - choices to refrain from benefits to the advantage of others – here and in the future. It involves searching for a sustainable balance between economical, ecological and social pillars of human life.

The search for appropriate answers requires learning processes on many different scales – international, national, regional, local and at the individual level. The complexity of the issues suggests multiple pathways leading to improvements – none of which are beyond discussion. “Ready-to-digest” information is not anymore sufficient. As there is no single solution, sustainable development is about finding appropriate directions. This implies a shift from science as the source of answers, to science as one of many partners in dialogue. If participation is desired, participants must be given room to believe (or know) that their involvement matters. Such a belief requires an ambiance of joint venture. Such an ambience is unlikely when science is positioned as the sole solution to the problem:

“When scientists speak of sustainability, they reflect an internal value system, a specific perspective, a particular belief structure. Because such beliefs are often concealed from public purview using “objective” science as a disguise, it fosters an illusion that the search [for sustainability] is intrinsically scientific.”

McCool & Stankey, 2004

This study hopes to add another (small) step in the search for effective approaches to allow learning about sustainable development (also known as Education for Sustainable Development). It focuses on the role boundary objects in general, and a Quality-of-Life monitor in specific, can fulfill as a central feature of a learning network in which “top-down” and “bottom-up” blend into a learning experience adapted to the complexity of issues today, but at a scale that individual learners can (geographically) oversee – the neighborhood.
Acknowledgements

This study would not have been possible without support “at home”. It is not always easy to combine work, social life and study. It has the potential to put some strain on the home situation. A study like this drives the stakes up - a lot of ground to cover, much to read and for all lots to think about. Daniela, thanks a lot for your support and for tolerating the moments I wondered around “absent mindedly”. It is highly appreciated and treasured.

Joop de Kraker has been guiding me through this process. Originally our first contact was for another project, but this one soon popped-up as an opportunity. It is great to find a study so close to the core of my personal ambitions in this field. Whenever I was drifting off, Joop has found a way to point me a direction to get back on track – thanks! Also thanks to Pieter Valkering for his input and reminders on practical application.
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Abstract

In order to come to robust solutions for sustainability issues, different perspectives and types of knowledge must be integrated. Multi-actor learning networks can provide the heterogeneous environments in which such integration can be achieved. Dialogue cannot be sustained in a vacuum. To trigger and sustain dialogue in a multi-actor network, a topic or object of shared interest is needed. Such a topic or object is referred to as boundary object. Boundary objects are meaningful across barriers, which facilitates dialogue between actors originating from highly diverse social groups. For the purpose of this study, the definition of choice is as follows:

"[Boundary objects] have the capacity to bridge perceptual and practical differences among diverse communities in order to reach common understandings and effective cooperation" (Karsten et al., 2001).

This study explores if a Quality-of-Life monitor can fulfill the role of boundary object in a regional learning network for sustainable urban neighborhood development. The study specifically positions such a monitor within a web-based environment based on social internet, which is intended to support the learning network. Within that network, a variety of actors are to engage in dialogue. This includes academics, professionals, practitioners and local stakeholders. It is thought that the last group (consisting of people living and working in the neighborhoods), poses the biggest challenges, which is why they receive most attention.

The Quality-of-Life monitor is to support learning processes between all actors involved. This calls for a coherent set of design features. The proposed features are based on recent insights from a disciplinary highly diverse literature. The insights are combined with analyses of the concepts of sustainable development and quality-of-life. The focus is on interrelation between insights and considerations for operationalization. This results in a conceptual design of a Quality-of-Life monitor. This design is then elaborated by providing concrete applications in relation to the case study.

Within the framework of the case study, there are three major challenges to be taken into account for the design of the monitor. These are triggering and sustaining active participation in the network, mobility within the network aimed at giving shape to heterogeneous sub-groups (Communities of Interest) and supporting learning processes within such groups. Design features also take current trends in internet use into account.

Dialogue within Communities of Interest provides for cross-boundary learning between the actors involved in urban neighborhood development, in support of the ultimate goal of the SUN project – improving quality of life. However, for local stakeholders it is argued that supporting the path of actually joining such groups is equally (if not more) important. The result is a design emphasizing accessibility, interactivity and, above all, flexibility. This is reflected in features such as self-reporting on subjective indicators and possibilities to adapt indicators and thresholds based on the outcome of dialogue. The envisioned Quality-of-Life monitor is thus both the trigger and the result of dialogue. For the support of learning the selection of indicators as a means to create cognitive dissonance is emphasized as an important feature.
Samenvatting

Om tot robuuste oplossingen voor duurzaamheidsvraagstukken te komen moeten verschillende invalshoeken en soorten kennis geïntegreerd worden. Multi-actor leernetwerken kunnen voorzien in de heterogene omgeving die voor die integratie nodig is. Een dialoog zonder aanknopingspunten valt stil. Om tot dialoog te stimuleren en om deze voort te zetten is een onderwerp of voorwerp van gemeenschappelijke interesse noodzakelijk. Een dergelijk onderwerp of voorwerp wordt “boundary object” genoemd. “Boundary objects” zijn grensoverschrijdend betekenisvol, wat een dialoog tussen actoren uit sterk verschillende sociale groepen ondersteund. Voor het doel van deze studie is gekozen voor de volgende definitie:

“[Boundary objects] hebben het vermogen werkelijke en ondervonden verschillen tussen groepen mensen te overbruggen met het doel tot collectief begrip en effectieve samenwerking te komen” (Door de auteur vertaald uit Karsten et al., 2001).


De levenskwaliteit-monitor moet leerprocessen tussen meerdere actoren ondersteunen. Daarvoor zijn samenhangende ontwerpkenmerken noodzakelijk. De aanbevolen kenmerken zijn gebaseerd op recente inzichten uit een disciplair zeer gevarieerde literatuur. Die inzichten worden gecombineerd met een analyse van de concepten van duurzame ontwikkeling en levenskwaliteit. De onderlinge relatie tussen inzichten en praktijkoverwegingen staan daarbij centraal. Dit resulteert in een conceptontwerp van de tool voor het meten van levenskwaliteit. Dit conceptontwerp wordt geplaatst in een case studie voor duurzame ontwikkeling in stadswijken waarvoor concrete voorbeelden uitgewerkt worden.

Binnen het kader van de case studie zijn drie significante uitdagingen vastgesteld waarmee in het ontwerp van de tool rekening gehouden moet worden. Het gaat daarbij om het motiveren tot (langdurige) deelname, mobiliteit binnen het netwerk om vorm te geven aan heterogene groepen (Communities of Interest) en om de leerprocessen binnen die groepen te ondersteunen. Daarnaast dient in het ontwerp rekening gehouden te worden met huidige trends in het gebruik van internet.

Het leren binnen de genoemde Communities of Interest voorziet in de grensoverschrijdende leerprocessen tussen actoren die betrokken zijn bij duurzame ontwikkeling in stadswijken ter ondersteuning van het hoofddoel van het SUN project – het verbeteren van levenskwaliteit. Voor plaatselijke belanghebbenden is het ondersteunen van het traject om tot deelname in zulke groepen te komen echter tenminste zo belangrijk. Het resultaat van het combineren van de inzichten is een conceptueel ontwerp waarin de nadruk gelegd wordt op toegankelijkheid, interactiviteit en flexibiliteit. Dit is te herkennen in kenmerken zoals zelfrapportage voor subjectieve indicatoren en in de mogelijkheid om indicatoren en streefwaarden aan te passen aan de uitkomsten van een dialoog. Daarmee ontstaat een instrument dat niet alleen de dialoog op gang brengt, maar ook zelf weer het resultaat is van die dialoog. Voor ondersteuning van leerprocessen wordt het belang benadrukt om te kiezen voor indicatoren waarvan verrassende resultaten te verwachten zijn.
1. Introduction

The Sustainable Urban Neighborhood (SUN) Project is an Interreg IVa financed initiative (InterregEMR, 2010). The SUN project seeks to improve the quality-of-life in neglected neighborhoods in the Euro-region Meuse, Rhine (EMR). To do this, various simultaneous and coordinated actions, grouped under the umbrella of sustainable development, are initiated. The three constituents of sustainable development – economic, environmental and social aspects – are pillars of the SUN Project. Specific project objectives range from improving social cohesion, increasing the number of companies or jobs in neighborhoods, to “greening” the area and reducing energy consumption (Ruelle, 2009). The efforts are to be supported by an exchange platform that is intended to remain active long after the funding period has ended.

3Lensus (3Le = Life-Long-Learning, n = Network, sus = sustainable development) project is a response to the widely accepted need for ESD (Education for Sustainable Development). The aim of the project is to find ways to overcome three identified challenges in this domain. These involve a need for self-directed learning, the requirement to develop trans-disciplinary knowledge that is adapted to real-life situations and a need for a holistic approach that seeks a balance between formal education and informal learning (3lensus, 2009). It is thought that a multi-actor learning network can aid in achieving these goals. The SUN project was selected as a case-study for which a web-based learning platform was designed, implemented and evaluated (de Kraker et al., 2010).

The success of a regional multi-actor learning network does not only depend on the technical design of the platform. It also requires active and continued participation of all intended actors. Because the goal of the network is to combine exchange of existing knowledge with shared development of new knowledge, consistent participation of all actors is a requirement. In addition to scientists from different fields of expertise, the term actor refers to local authorities as well as professional experts and the people living and working in the targeted urban neighborhoods. Projects for sustainable development in general, and the SUN project in particular, require cross-boundary learning and communication. De Kraker et al. (2009) have suggested to support such learning processes with a Quality-of-Life monitor that would function as a so-called ‘boundary object’.

A boundary object can be a concept, a physical object, a computer application, an idea or anything else with the potential to trigger and sustain dialogue across a boundary. Its function is well expressed in the following quote: “[Boundary objects are artifacts that] have the capacity to bridge perceptual and practical differences among diverse communities in order to reach common understandings and effective cooperation” (Karsten et al., 2001). Within the confines of the SUN project, the issue of quality-of-life is of common interest to all actors and may thus serve as a bridging concept. This Master thesis explores how a Quality-of-Life monitor could serve as a boundary-object. It explores the potential roles a boundary object could fulfill and argues which features and design considerations should be kept in mind for successful implementation.

1.1 Problem

The needs for learning, knowledge distribution and development of new knowledge for the SUN project are particularly challenging. An international project setting and a multi-cultural nature of selected neighborhoods are combined with concepts of sustainable development
and quality-of-life in a single project. The wish to set up initiatives that continue beyond the Interreg IV funding period is a further challenge. All this calls for a well-designed learning platform of which the Quality-of-Life monitor (the object of this study) is to be a part.

An off-the-shelf solution for the ambitions of the web-based learning platform is not available. Although existing tools can (and should) be integrated in the efforts, a certain level of case-specific programming (probably) cannot be avoided. Such programming is a one-time effort. A second chance to “get it right” is normally not an option for projects (such as the SUN project) running over a pre-defined period of time. The unique situation of the SUN project also provides an opportunity to observe a learning platform “in action”, which could give valuable input for future network needs. Both its functionality for the SUN project and the network platform’s value for “learning about social learning platforms” depend on the extent to which an optimal solution is approached. It is thus important to give the learning platform in general and the Quality-of-Life monitor in particular, adequate thought and to study several options and possibilities to come up with a solution with a solid theoretical basis. The study to provide this theoretical basis was guided by the questions in the following sections.

1.2 Central Question
The ultimate SUN project goal is to increase the quality-of-life for the inhabitants in existing urban neighborhoods (in the EMR area), by promoting and supporting sustainable development. Learning, both as shared creation of new knowledge and exchange of existing knowledge, can support the achievement of this ultimate goal. Because of the involvement of various groups of stakeholders and the geographical distribution of the neighborhoods participating in this project, such learning requires cross-boundary dialogue. A boundary object could trigger and sustain such dialogue, provided it is meaningful for the parties involved. Quality-of-life could very well be envisioned to fulfill that requirement. Quality-of-life also lends itself for meaningful (interactive) monitoring at the geographical scale of the project. This study therefore addresses the following question: "What would be recommended features of a web-based Quality-of-Life monitor as boundary object in a multi-actor learning network and how can these features support the SUN project’s ultimate goal via cross-boundary learning processes between the actors involved?"

1.3 Sub-Questions
In order to answer the central question, a number of sub-questions were addressed. In chapter three of this report each of these questions is explored in a separate section, including a discussion and a conclusion:

1. What are boundary objects and what role do they fulfill in dialogue and learning?
2. What is the relation between sustainable development and quality-of-life and how is the concept of quality-of-life made operational within the setting and scale of the SUN project?
3. What is a multi-actor learning network and what is the basic structure of the web-based learning-network platform as it is designed within the 3Lensus project for the SUN case-study and what would be a logical positioning of a Quality-of-Life monitor as integrated part of that network platform?
4. What are existing/suggested applications of the boundary object related concepts? Are results/experiences/expectations of these applications documented and can information be derived from these observations with respect to features to support learning?
5. How can a working definition of quality-of-life be implemented in a Quality-of-Life monitor?
6. What features/procedures of a Quality-of-Life monitor offer a promise of initiating and sustaining active participation and communication between various parties in the SUN project (including inhabitants, local authorities and scientists)?
7. What features/procedures of a Quality-of-Life monitor offer a promise to support learning processes in terms of the shared creation of new knowledge, as well as
exchange of existing knowledge and what conditions should be met to materialize the promise?
8. What would a schematic representation of a Quality-of-Life monitor incorporating the identified features look like and what are options to integrate such a function in a multi-actor learning network for sustainable urban development?
9. What technical options and constraints should be kept in mind for the design of a Quality-of-Life monitor?

1.4 Scope of this Study

This report concentrates on the design of a Quality-of-Life monitor in the setting of the SUN project as a learning network and as part of the web-based network platform that 3Lensus is developing for this project. The actual implementation of a Quality-of-Life monitor is not part of this study. This study is thus limited to providing a theoretical basis for such a feature.
2. Method

This study was divided into four phases, each with (a) different method(s). These phases are shown in figure 1. Phase 1 is related to the first four sub-questions. Question 2 and 3 concentrate on the 3Lensus and SUN projects. Information was gathered from available sources. This included an interview with Joop de Kraker and access to the Learn4SUN internet based learning platform. A review of gathered information, together with the study of project documents then served as a basis (or framework) for the actual subject of this project.

Both the title and central question of this study indicate that work from different disciplines must be combined. For example: sustainable development and quality-of-life are issues in various disciplines, boundary objects belong to the domain of social sciences and learning networks to educational sciences. The wish to provide a web-based tool also requires insights from the domain of information technology. To answer sub-questions 1 and 4, it is thus necessary to study recent literature from different fields.

Special attention was given to applications of boundary objects in search for documented observations and experiences with its functioning. This was intended to include literature on concepts or items that fulfill the definition of a boundary object, but without addressing it as such. Examples of such cases could be found in research on participatory monitoring, such as the PhD thesis of Guijt (2008). In the course of the study it has however become clear that a broader approach was needed. The number of publications covering actual work with boundary objects (even if not addressed by that name) was to too limited to draw conclusions. For that reason related research was taken into account. An example is the work of Cash et al. (2003). It addresses behavior at boundaries, without positioning this behavior around a boundary object.

Phase 2 was meant for analytical reading of items selected in phase 1. Since items were collected from various domains, differences in terminology partly required consulting background sources to identify possible overlap with information from other sources and to group existing knowledge from various fields to combined (new) knowledge specific for this case. While doing this, the design of the Learn4SUN learning platform was kept in mind. In this phase the aim was to provide answers to the sub-questions 1 through 7 that are listed in
section 1.3. In order to provide a basis for answering the remaining questions and the central question of this study, a conclusion for each of the sub-questions was formulated.

Phase 3 was to provide an answer to the central question, as well as the answers to sub-questions 8 and 9. For this purpose an interview was conducted with an IT specialist. The interview served to identify technical limitations for schematic representation of the proposed Quality-of-Life monitor (section 3.8) that was based on findings in phase 2, as well as options for the integration of a Quality-of-Life monitor with an internet based platform.

Phase 4 finally was completed with the publication of this report.
3. Results & Discussion

This report is written to argue the rationale behind recommended features of a Quality-of-Life monitor as boundary object in a multi-actor learning network. The emphasis is on the way that monitor can support the SUN project’s ultimate goal of improving quality-of-life via cross-boundary learning processes between the actors involved. The resulting conceptual design is based on a disciplinary highly diverse literature and guided by the sub-questions that were presented in section 1.3.

Each sub-question is addressed in a separate section. First the results of the study are provided, followed by a discussion. The results and discussion are then summarized in a (sub) conclusion as response to the sub-question.
3.1 Boundary Objects

Before addressing the conceptual design of a Quality-of-Life monitor and its features to function as a boundary object, it should be clear what a boundary object is. This first section explores what boundary objects are and what role they fulfill in dialogue and learning.

Interaction does not happen in a vacuum – it normally takes place around a social object. A social object is anything that serves as a reason why two persons communicate with each other, rather than with somebody else (Hinchcliffe, 2010). This could be anything from quantum-physics to the latest football match. It could be a word, an activity, a person, a physical object or anything else that is interesting and meaningful for people to engage in dialogue. The concept of social objects is contested (Smith & Searle, 2010), but one could view a social object as being the subject of conversation.

People are part of social groups. A social group comprises two or more people who share some common characteristic that is socially meaningful for themselves and for others (Smith & Mackie, 2007). A single person is part of multiple social groups. Big groups relating to gender, nationality, ethnic affiliation or religion and smaller groups such as family, sports club, neighborhood, company, or project team. A social object that is meaningful in one group does not necessarily have meaning in another group – even if it involves the same person. In your project-team, a sheet with test-run results would be a social object, but you would hardly expect dialogue to shape around those results when meeting with family or team-mates in your sports club. Social objects only serve as conversation pieces for specific social groups.

When it is the intent to trigger dialogue between different social groups, boundaries must be crossed. An absence of socially meaningful common characteristics can hamper continuation of any dialogue that is attempted. Common ground between the different social groups must be found. Combining multiple social groups (or communities) suggests additional requirements for a social object – a social object that can bridge across boundaries between communities by being meaningful for a heterogeneous group. Star and Griesemer (1989) first introduced the concept of such a special type of social object and called it boundary object. Since then the concept has spread widely. For the purpose of this study, the definition of choice is as follows:

“[Boundary objects] have the capacity to bridge perceptual and practical differences among diverse communities in order to reach common understandings and effective cooperation” (Karsten et al., 2001).
Such a boundary object would bridge boundaries between parties in the learning network. Figure 2 provides a simplified representation in which scientists, public, expert and policy makers are each seen as single communities. In reality, each of these groups most probably consists of several communities. In order to fulfill its function, the boundary object needs to address an issue of interest for all intended participants. In direct relation with the SUN project and the Learn4SUN network, De Kraker et al. (2010) offers the following indication of what such shared interest might be:

“Discovering the shared interest of all participants in the SUN-project and giving it a central place in the design is [...] crucial. In the SUN-project, access to monitoring data combined with the opportunity to participate in the construction of indicators, in the definition of protocols and in the interpretation of the results could be this shared interest” (de Kraker et al., 2010).

Envisioned in this way, the specific boundary object for the learning network that is to support the goals of the SUN-project would be a dynamic instrument that is both the trigger and the result of dialogue. Starting off as a generic tool or a concept only, the tool grows as consensus is reached on the construction of indicators and as monitoring protocols are defined as a shared effort. At the center of dialogue between multiple social groups, the boundary object should trigger and support a variety of learning processes. Learning processes (further explored in section 3.7) take shape around discussion and debate on monitoring efforts and the results these efforts produce. Because of a rich variety of people from different disciplines and background, dialogue could provide for a rich learning environment in which a variation of knowledge and perspectives are shared. The fact that the boundary object plays such an important role in keeping various groups involved makes its design and the choice of its content such a crucial factor.

Sub-conclusion
This first section explored what boundary objects are and what role they fulfill in dialogue and learning. A boundary object is found to be a “special form” of a social object – to be seen as a subject of conversation – but in this case not only for people who are part of a same social group as it would be for a “normal” social object. A boundary object should aid in opening and sustaining dialogue amongst people belonging to different social groups. A key characteristic is that the boundary object covers common ground. Discovering shared interest of all parties intended to participate in dialogue is a first step toward the design of an effective boundary object. An effective boundary object triggers dialogue, which in turn leads to learning.
3.2 Sustainable Development, Quality-of-Life & SUN

The SUN project aims to improve quality-of-life in neglected urban neighborhoods in a sustainable manner. The boundary object addressed in the previous section has to be related to this goal. This section explores what the relation is between sustainable development and quality-of-life and how the concept of quality-of-life is made operational within the setting and scale of the SUN project. Combined with both the previous and the next sections, these notions should provide the theoretical framework for the Quality-of-Life monitor as a boundary object in the Learn4SUN web-based learning network.

3.2.1 Sustainable development

The need for sustainable development has repeatedly been identified by international and national bodies. Starting with the Brundtland report in 1987, the concept has been reconfirmed on many occasions and multiple intentions to act accordingly have been expressed. But as Kates, Parris and Leiserowitz (2005) have pointed out, the concept of sustainability is not always easy to grasp. There are repeated re-interpretations of the concept and the wording sometimes makes it hard to define what is sustainable and what is not (as it is to define what is to be considered development). Sustainable development as a concept is the subject of an ongoing discussion (Adams, 2006).

For the purpose of this study analyses of different views on sustainable development are not needed. It suffices to acknowledge that sustainable development is generally considered to have three major dimensions (social, economical and environmental) and that development in one dimension should not go at the expense of one of the others. Nor should development here and now go at the expense of future generations or people living elsewhere.

Processes aimed at achieving sustainable development are not linear. A dialogue between all affected and interested parties could lead to repeated adjustment and refinement of the initial vision, while constantly receiving input on the borders between possible and impossible, desired and undesired or relevant and irrelevant. This can be seen as an iterative dialogue. A situation in which the very aspect needed to get started or continue is in part the result of your own deliberations – a circle with an obscured point of entry. Without scientific guidance, the vision and/or clear goals in policy statements on sustainable development would lack theoretical foundations. Without clear goals (or at least a clearly stated vision), scientists cannot establish a list of indicators that permits monitoring. That would complicate the design of any monitor, such as the Quality-of-Life monitor that is the subject of this study.

The iterative dialogue described above is not a new concept. Policy makers interact with science, the public, industry and others. The process is an inherent part of democracy. What is relatively new is the vast quantity of aspects to be taken into consideration when combining the concept of development with the concept of sustainability. Problems in which so many aspects, views and considerations come together are referred to as “messy or wicked problems”. Bielak et al. (2008) see linear processes as unsuitable for messy problems such as sustainable development.

According to Ravetz and Funtowicz (1999) the solution is to be sought in “post-normal” science. They propose that the methodology of post-normal science is to be applied whenever the stakes in a decision making process are high, when risk factors are involved and/or when decisions involve a high level of uncertainty. Sustainable development, including local efforts in neglected urban neighborhoods, clearly falls into this category.

In what is currently seen as normal science (Kuhn, 1970), those who do not belong to the scientific community do not take part in scientific problem solving. A key characteristic of post-normal science is the recognition of the existence of a plurality of legitimate perspectives (Funtowicz & Ravetz, 1993). This opens the way to a dialogue between various
stakeholders with various perspectives on the issue at hand. Such an ensemble of stakeholders is often referred to as an “extended peer community”. Saloranta (2001) has confronted the IPCC procedures with the theory on post-normal science and found that the approach has advantages over “normal science” with respect to wicked problems.

Improving quality-of-life in a neighborhood-setting requires a dialogue between various stakeholders. This is a key characteristic of the web based learning platform Learn4SUN. Post-normal science with its extended peer community implies recognition of plurality of legitimate views. Features of monitoring efforts should reflect this view in being equally accessible and meaningful for all intended stakeholders. Quality-of-life at the (geographical) scale of the project is more likely to fulfill that purpose than addressing sustainability in a more inclusive manner, adding dimensions of time and increased geographical scale.

3.2.2 Quality-of-Life

Given the objective to provide a theoretical basis for the design of a Quality-of-Life monitor, a question coming to mind is what the definition of quality-of-life actually is. The term quality-of-life is found in many publications and policy statements (on 13-11-2010, Google Scholar generated 2,940,000 hits for a “quality of life” search). But, as Costanza et al. (2008) observe, an adequate definition of the term as well as procedures for measurement, have been elusive. They report on a congress hosted by the University of Vermont in which a group of scientists representing a broad range of fields from natural and humanity disciplines came up with the following definition:

“Quality of Life (QOL) is the extent to which objective human needs are fulfilled in relation to personal or group perceptions of subjective well-being. Human needs are basic needs for subsistence, reproduction, security, affection, etc. Subjective well-being is assessed by individuals’ or groups’ responses to questions about happiness, life satisfaction, utility, or welfare. The relation between specific human needs and perceived satisfaction with each of them can be affected by mental capacity, cultural context, information, education, temperament, and the like, often in quite complex ways. Moreover, the relation between the fulfillment of human needs and overall subjective well-being is affected by the (time-varying) weights individuals, groups, and cultures give to fulfilling each of the human needs relative to the others” (Costanza et al., 2008).

The definition combines objective measurements with subjective indicators for well-being. Subjective indicators focus on self-reported grades for happiness, fulfillment and other ultimate human goals. Objective measurements of quality-of-life focus on measurable indicators for economic, social or health factors. Objective indicators measure the potential (or opportunities) for an improved quality-of-life, but in many cases not quality-of-life itself (Costanza et al., 2008). Economic productivity would be an example in case. Economic productivity is likely to increase the availability of monetary resources. These resources have the potential (can be used for) to improve quality-of-life. The existence of that potential does however not offer a measure of the extent to which those opportunities are taken, nor does it measure if opportunities taken result in a perception of need-fulfillment.

In relation to objective indicators, two additional observations are of interest. Costanza et al. (2008) report that opportunity-bias occurs frequently – this refers to the practice of including measurements, simply because the data are available or easy to get. The second observation draws attention to the fact that objective measurements find their basis in subjective decisions on what to measure and how. A similar observation is expressed by De Kraker and Cövers (2006) in relation to a Dutch approach for calculating sustainable national income. Objective measurement alone is thus not likely to capture a subjective concept such as quality-of-life. A broader approach is introduced with the following statement:

“The ability of humans to satisfy […] basic needs arises from the opportunities available and constructed from social, built, human and natural capital (and time). Policy and culture help to allocate the four types of capital as a means for providing these opportunities” (Costanza et al. 2008).
In relation to the above quote, social capital is defined as networks and norms that facilitate cooperative action. Our knowledge, health and potential to perform labor are human capital. Built capital refers to goods, tools and infrastructure and the natural capital to natural ecosystems. As shown in figure 3, the flow of benefits originating from the capitals results in opportunities (or a potential) to improve quality-of-life.

In order for an increase of quality-of-life (QoL) to occur, opportunities have to be taken. The fact that courses are available does not increase our knowledge unless they are visited. The fact that courses are visited and completed does not improve QoL when newly acquired knowledge and skills stay inert. Opportunities taken can objectively increase QoL in the sense of a longer life-expectancy, a higher salary or other, but that does not automatically result in an increase in the subjective QoL perception. The feelings people have of their expectations from life depend on how they envision what they consider a good life (or QoL). Next to their own envisioning, social factors play a role. The vision of a good life is shaped by family, peers, media and other (see figure 3). Capturing subjective QoL is thus not likely unless self-reporting is used as a method.

An increase in QoL can thus be seen as noticing feelings of improved need fulfillment, resulting from opportunities taken of flows of benefits originating from capitals. The concept of sustainability on the other hand is at the same time concerned with capitals - capitals such as those identified by Costanza et al. (2008). In the domain of sustainable development it is argued that flows of benefits from capitals are not to result in the depletion of those capitals – they should remain in an acceptable and sustainable state in order to support flows of benefits elsewhere and for future generations.

Considering that, sustainable development can (roughly) be viewed as ceaseless opportunities for a good quality-of-life. This is in line with the preferred definition of sustainable development expressed by the Netherlands Environmental Assessment Agency, although this definition applies to a bigger geographical scale (national) than neighborhoods:

“Sustainable quality of life in a national setting is the quality of life enjoyed by the population within the national territory, the level of which is (1) viably reproducible for the current generation, given the natural and social resources commanded by the nation, and (2) is gained neither at the expense of an acceptable quality of life for (2a) members of the present generation outside the nation, nor of that of (2b) members of the next generations at home and (2c) the next generations elsewhere” (Robeyns & van der Veen, 2007).

In relation to this study, the above means that measuring QoL would involve indicators that capture both the state of opportunities, as well as perceptions of need fulfillment. If monitoring should capture sustainability as well, then indicators measuring the condition of capitals should be added. Although social capital can grow when it is used (as an example),
other capitals would probably decrease or even be depleted. Measuring flows of benefit can thus not provide insight in the condition of the capitals.

In relation to monitoring for the SUN project, some challenges are identified. (1) There is a wish to compare different neighborhoods, which calls for a uniform set of indicators, while at the same time justice should be done to the specific nature and culture of individual neighborhoods. (2) Sustainability is to be captured. (3) Measurement of sustainability should capture stakeholder perceptions, by being interactive (SUN, 2010).

Taking up those challenges, integration of a monitoring tool with the exchange platform offers potential as a boundary object to support learning processes amongst stakeholders. However, as it will become evident in later chapters, a mix between monitoring in the traditional meaning of collecting data and monitoring as a tool to cross boundaries in order to support multi-actor learning processes is not always compatible.

The declared “ultimate goal” of the SUN project is an increase of quality-of-life in a sustainable manner (Ruelle, 2009). QoL is addressed in the SUN definition for a sustainable urban neighborhood (for a copy of the definition, see appendix A). The most explicit reference is quoted below, but other points also implicitly address the capitals related to quality-of-life in the view of Costanza et al. (2008), as well as the social network in which QoL is perceived:

“[A sustainable urban neighbourhood] offers a living environment where inhabitants feel good and do not want to leave. They feel inspired and engaged to participate in the developments going on in their neighbourhood because they care for their own living place and for their well-being and that of others. They experience a good QoL on the levels of health, social aspects, economic participation and ecological space” (Beumer, Valkering & Ruelle, 2010).

SUN does thus not view quality-of-life only as an outcome of sustainable development, but also as a prerequisite in the sense that it supports the inspiration and motivation for active involvement in development efforts. The terms “feel good” and “do not want to leave” imply that subjective well-being is considered an important characteristic of a sustainable urban neighborhood. An explicit definition of quality-of-life is not presented in the available documentation relating to the SUN project.

SUN (2010) have explored possible indicators to measure sustainability in sustainable urban neighborhoods. In relation to measuring sustainability (and with that quality-of-life) for the SUN project, a list of indicators is not yet decided on.2

A list of criteria to be used to measure QoL or sustainable development can be long. The First European Quality-of-Life Survey (Alber, 2004) can serve as an example. There are (many) other, but most address an international or at least nation-wide setting. With respect to a project seeking to improve quality-of-life in specific neglected neighborhoods, existing lists pose a challenge. Not all points in these lists are relevant to the specific neighborhoods situation. Access to highways for example is subject to national policy and cannot be influenced at the level of an individual neighborhood. Local opinion may set different priorities than national or international agendas. Where national policy would be interested in how well a new airport connects to existing infrastructure, local opinion could be more concerned with the noise produced by starting and landing aircraft.

Sub-conclusion

In this section, the following question was addressed: What is the relation between sustainable development and quality-of-life and how is the concept of quality-of-life made operational within the setting and scale of the SUN project? In line with the intent of the SUN

2 Currently, the SUN project is taking up the approach of ‘Urban Observatories’ to monitor developments related to sustainability and QoL in the various neighborhoods
project to increase QoL in neglected urban neighborhoods in a sustainable manner, sustainable development can be viewed as “ceaseless opportunities for a good quality-of-life”.

Indicators of QoL, both objective and subjective are thus at the same time indicators of sustainable development. However, if a monitoring tool captures QoL in an adequate manner, it does not at the same time adequately capture sustainable development. For that purpose not only the flows of benefits (coming from capitals) and their (perceived) results should be measured, but also the condition of those capitals from which the flows of benefits originate.

Within the SUN project, quality-of-life is both viewed as an outcome of sustainable development and as a prerequisite. In their vision on what a Sustainable Urban Neighborhood is, subjective quality-of-life gets the most explicit attention. With respect to monitoring, some challenges are identified:

1. How to deal with the conflict between the need for comparability and the need to do justice to differences?
2. How to capture sustainability?
3. How to measure stakeholder perceptions?

With respect to the web-based learning platform Learn4SUN, we consider an additional challenge: How to support learning processes by making indicators part of a Quality-of-Life monitor that would function as a boundary object?

The process of establishing a list of indicators that fulfills the needs identified by the above challenges is ongoing in the SUN project.
3.3 Learning Networks & 3-LENSUS

In order to complete the theoretical framework for the Quality-of-Life monitor, this section is guided by the following question: What is a multi-actor learning network and what is the basic structure of the web-based learning platform as it is designed within the 3Lensus project for the SUN case-study and what would be a logical positioning of a Quality-of-Life monitor as integrated part of that network and the web-based platform?

The SUN project functions for 3Lensus as a case-study to design a learning platform to investigate the potential of Web 2.0 features. According to De Kraker et al. (2010):

“The project aims to generate a learning process across borders, between local government officials, neighborhood inhabitants, professionals in neighborhood renovation and community activities, and scientific experts in sustainable urban development” (De Kraker et al., 2010).

For practical purposes, the social networking software Elgg (www.elgg.com) was chosen. The three core elements of this application are a central network site, communities, and a personal page for all members. All these parts are interconnected. De Kraker et al. (2010) describes the main functionalities as follows:

“[…] the central network site is fed with information from the communities and member pages, and the member pages are fed by information from the communities and other member pages. The central network site functions as a portal: it provides general, public information and news (e.g. on the neighborhoods) and access to the communities and member pages through a log-in. The communities provide a place for focused knowledge exchange, discussion and collaboration. Communities provide functionalities like discussion forums, file up/download, blogs, photo and video galleries, and bookmarks. Access and other rights for the communities can be set at any desired level, ranging from public to very restricted” (De Kraker et al., 2010).

The major difference compared with traditional platforms for knowledge exchange is seen in the non-hierarchic structure of the network platform. The structure is to be self-organizing, meaning that users can create dedicated communities at will and define with whom they want to share their content, or with whom they want to discuss. In such a structure, every participant (or member) is at the same time a provider and a consumer of information. De Kraker et al. (2010) refers to this as a bottom-up approach. Structuring a platform with an expectation of a self-organizing character comes with the challenge of providing incentives for active and continued participation. It is expected that providing a central place for an object of shared interest, such as a Quality-of-Life monitor, can aid to overcome this challenge.

A Quality-of-Life monitor can be an active and dynamic tool. Experiences from participatory monitoring (and/or community science) serve as a model in this respect. According to Guijt (2008), monitoring can be viewed as the creation of the necessary feedback-loops that ensure that collective learning is fed by ongoing information flows among members of “messy partnerships”. In such cases, the information flow and learning are thought to stand at the basis of a desire for concerted action. This thus places monitoring, and with that a monitoring tool, in a learning-oriented position. A shift in the perception of monitoring from viewing it as a data-system to viewing monitoring as a communication process is proposed. In relation to rural development – a situation that differs from urban neighborhood development, but is also characterized by wicked problems and messy partnerships, Guijt shares some views on how learning around monitoring is to take place:

“Messy partnerships must maintain coherence in their organizational and collective cognition, and correspondence with the external environment. Cognition in a messy partnership is distributed, which requires convergence in order to come to effective concerted action. Sense-making is critical for convergence for which different approaches are needed, depending on the complexity of the circumstances and issues faced. Cognitive dissonance, or 'surprise', is an important indicator where coherence or correspondences are awry. Monitoring systems could be more purposively designed based on valuing cognitive dissonance as an important trigger for learning” (Guijt, 2008).
Learning processes as described here cannot be expected to result from merely viewing data coming from monitoring pre-defined indicators. A shift toward viewing monitoring as a communication process implies more. Active participation in construction of indicators, definition of protocols and/or interpretation of results, is seen as a basis for shared interest. That makes both the object itself and the interactions taking place around it active and dynamic. This is illustrated in the following quote:

“[…] participants could jointly define and construct relevant indicators […], determine needs for monitoring data […], establish protocols for data collection, store and present monitoring data, discuss trends in indicators and contribute to subsequent decision-making. Inhabitants could see how their neighborhoods fare, local government officials could observe the effect of policies, professional experts are informed about the performance of solutions in different contexts, and scientific researchers can perform integrated analyses. Moreover, they could all share their interpretations and reflections with each other and engage in a dialogue on the meaning and implications of the data” (De Kraker et al., 2010).

Providing adequate incentive for active and continued participation is of particular importance because of the aim to transform the learning network into a long-term Euregional observation and exchange platform with a life-span that extends beyond the project funding period. Designing for continued participation is viewed as a challenge in relation to the multi-actor learning network (Valkering et al., 2010).

The SUN learning network can be visualized as three concentric circles. Academics, experts and practitioners are positioned in the center of the network, with local stakeholders and Euregional professionals being positioned around this core. As illustrated in figure 4, the last category of “learners” are people and institutions not directly affected by the project.

![Figure 4 – A representation of the SUN learning network (Valkering et al. 2010).](image-url)

When proposing the Quality-of-Life monitor that is subject of this study as the active and dynamic tool that aids in initiating and sustaining participation, the subject of positioning that tool requires some attention. Based on the assumption that the “boundaries” between the three concentric circles are semi-permeable and on the assumption that the tool should be visible for all interested parties in order to fulfill its function for initiating and sustaining interest, a logical position would be at the outskirts of the learning platform. That is – the Quality-of-Life monitor would be visible on a public webpage without requiring login-procedures to have access to a visual representation of the data. Such a location could be the public page of the network platform. In that case a requirement would be that full functionality and representation would be possible without requiring registration and login. If
that is not an option (because of technical restrictions) other possibilities should be explored. As an example, it could be linked with the web-based community where the actual discussion, interpretation and other interaction around the monitor takes place. In relation to the SUN project, a possible alternate location would be the project web page (www.sun-euregio.eu).

**Sub-conclusion**

This section explored what a multi-actor learning network is and what the basic structure is of the learning-network as it is designed within the 3Lensus project for the SUN case-study. It also looked into a logical positioning of a Quality-of-Life monitor as integrated part of that network.

A multi-actor learning network is proposed to be a self-organizing structure in which a clear hierarchy is absent. Users can position themselves within the network depending on their interest and comfort zone. They can be observers only, or active participants. Active participants are both provider and consumer of information and can define who can read their input and with who they want to have dialogue on which subject. Within such a network, three concentric circles give insight in the positioning of different actors. Within that structure, a Quality-of-Life monitor is to fulfill different roles.

Next to the most logical function of a monitor – monitoring – the Quality-of-Life monitor is to serve as a boundary object. In part, initiation, sustaining and intensity of dialogue taking place in the network depends on the way the monitor fulfills its role as a boundary object. Viewing monitoring from a communication perspective rather than a data perspective may help to stimulate learning processes.

Considering that part of the networks platform (Learn4SUN) is semi-permeable in the sense that it requires registration, login or requesting membership (for groups), the actual location of the monitor requires some attention. Goals of the monitor such as initiating participation are likely to be better addressed when all parties have access to the full functionality – that includes the outside world and people potentially interested in joining the network. This means that the page on which the monitor is displayed must be publicly accessible.
3.4 Features Derived from the Literature

Now that the framework for the Quality-of-Life monitor as a boundary object within the SUN project is explored, it can be enriching to see what existing or suggested applications of boundary objects or related concepts are. In particular the question arises if results, experiences or expectations of these applications are documented and if information can be derived with respect to features to support learning. Although documented experiences specifically related to boundary objects in learning networks for urban neighborhood development are not found, findings from other fields (both positive and negative) could help to streamline efforts.

Before actually addressing boundary objects, it might be good to take a look at some of the characteristics of the location of these objects – boundaries. Boundaries are real or perceived barriers. Barriers tend to limit communication taking place across them. The nature of the barrier can be related to language, geography, social context, generations, level of education, use of vocabulary, tradition, ethnical situation and much more. Within the scientific community for example, such boundaries traditionally exist between the various disciplines. A quote from Fischer (2004) provides some context for the importance of boundary crossing:

“Boundaries are the locus of the production of new knowledge. They are where the unexpected can be expected, where innovative and unorthodox solutions are found, where serendipity is likely, and where old ideas find new life” (Fischer, 2004).

Crossing boundaries thus makes sense because it allows existing knowledge from different sources to be combined to new knowledge. New knowledge is helpful because it can provide unexpected, innovative and unorthodox solutions for existing problems. The availability of such solutions in turn increases the chance that knowledge is translated into action. The chance that action actually results from an increase in knowledge is a subject addressed by Cash et al. (2003). After analyzing case-studies they draw conclusions with respect to communication, translation and mediation. These are addressed next.

For communication across boundaries to be effective, it should be two-way communication. It is also important to provide for frequent opportunities to participate in a dialogue. Cash et al. (2003) point out that a feeling of exclusion tends to provoke “counter attacks”. They also point at the importance of the needed translation so that parties can understand each other. This can obviously be related to language barriers (as they do exist within the framework of the SUN project), but it also relates to vocabulary used in different professions and to social context. An example of a lack of translation exists when scientists seek respect from other scientists and adopt a vocabulary aimed at that purpose only. Solutions for that last problem are sought in participatory research/monitoring. Participatory monitoring is explored by Guijt (2008). In relation to this subject she addresses a need for adaptations of monitoring if a role in learning is desired:

„Monitoring requires innovation if it is to contribute to its much lauded potential to enable learning. A shift is needed to see monitoring as: dialogical (not only a singular rationality), multi-ontological (not only assuming an ordered universe), distributed (not centralized), functioning through relationships and heuristics (not only through data and the hope of omniscience), essential for impact (not just a contractual obligation), sustaining collective cognition (not only the tracking of implementation), and seeking surprise (not only documenting the anticipated)” (Guijt, 2008).

Wicked problems point to another aspect requiring attention. In relation to sustainable development, it is probable that solution of problems includes compromises. This makes it likely that all parties have to “give and take”. It gives communication at boundaries characteristics of a negotiation. A negotiation in turn requires some sort of mediation to handle situations including some level of conflict of interest. This leads to a key characteristic of a boundary. A boundary is completely open for effective communication and translation (in the sense as explained in the previous section), but is at the same time semi-permeable in the sense that each party is autonomous at his own side of the boundary (Cash et al. 2003). For taking benefit of crossing boundaries in the sense that new knowledge is created and...
that new knowledge actually leads to action, some sort of mediation seems to be needed – this is referred to as boundary management.

Mediation at boundaries in relation to sustainable development was explored in detail by Læssø (2008). His explorations start with a historical perspective. In the late sixties, the rapid transformation of nature and neglect of consequences, lead to activism on the part of students and youth. He sees participation in this movement as becoming part of a social emancipation process – a classic example of a bottom-up process. However, in the late seventies he observes a professionalization movement in which the environmental movements become non-governmental organizations, which reduces the role of ordinary citizens to a status of “worried audience” – an example of the contrasting top-down approach to communication. The next big change starts with the publication of the Brundtland report. This represents a movement toward a discourse that can claim consensus between all agents. He quotes Hajer (1995, as referred to in Læssø, 2008) to express the current archetype:

“[Sustainable development] is for the common good and everybody has to contribute and cooperate” (Hajer, 1995 as referred to in Læssø, 2008).

The essence of this historical view is that we are not dealing anymore with the bottom-up approach of the seventies, nor are we dealing with the top-down approach that started to develop toward the eighties. Although Læssø (2008) does not express it with as many words, the current situation can very well be viewed as a combination of the two. At the place where top-down and bottom-up meet, Læssø (2008) positions a mediating agent. In his case this would be a person, but as his function would overlap with that of a Quality-of-Life monitor as a boundary object, it is relevant to consider the dilemmas of such an agent.

Læssø (2008) is adamant about the consequences of putting “participatory processes” and “sustainable development” on the table as a combined package. He poses that participation implies the democratic argument that people should have an opportunity to influence their own life conditions (or quality-of-life), while sustainability argues a need for restraint in order not to hamper others (elsewhere or in the future) to do the same. In order to find a balance between the two, mediation should combine aspects of networking, interpretation and facilitation. In order to fulfill such a task a mediator should be well-trained – as a consequence, a mediator is likely to be a professional third party.

Tension between listening to the voice of the people and promoting reflection and learning about the common good in relation to other places and other times poses a dilemma for mediators. It is a methodological challenge that seems to be inherent to the participation/sustainability combination. This methodological challenge can be overcome depending of the level of training, engagement and rapport of the third party mediator. Læssø (2008) refers to them as “the new catalysts” of ESD (Education for Sustainable Development).

It is now time to confront potential challenges at boundaries as discussed thus far with the notion of a boundary object. As a reminder, the working definition is repeated below:

“[Boundary objects] have the capacity to bridge perceptual and practical differences among diverse communities in order to reach common understandings and effective cooperation” (Karsten et al., 2001).

The capacity to bridge differences puts requirements on boundary objects. It must be common ground – a subject of conversation that is, in itself, sufficiently interesting for the targeted parties to engage in a dialogue to reach understanding and cooperation. Common ground does not imply that parties agree – it simply means that the boundary object is in itself sufficiently interesting to trigger dialogue. As people differ in their social mobility (Smith & Mackie, 2007), this common ground is to provide a strong message that is sufficient to overcome psychological barriers.
Positioning sustainable development (or the monitoring of that concept) as a boundary object implies positioning citizens and their voted representatives as parties who are sufficiently interested in sustainable development as a subject of dialogue. A recent poll (Telegraaf, 2010) amongst Dutch people provides indications that this is not the case. On the contrary - the survey shows a landslide shift toward personal interest and benefit compared to three years before. This can be considered a strong indicator that improving the quality-of-life for oneself and those close to one could very well be sufficiently interesting to engage in dialogue. At the same time it is an indicator that the subject of restraint in the use of “capitals” is less likely to initiate active participation.

Boundary objects allow per definition no room for opposite interest or disputes. You can hardly use something to bridge perceptual and practical differences as long as “the bridge itself is under attack”. Boundary objects spark and sustain dialogue. Within that dialogue there is place for debate on opposite interest and disputes. The boundary object itself however should not be the very subject of dispute. If that were the case, the boundary object would serve to separate groups rather than bridge between groups.

De Kraker et al. (2009) proposes an avenue matching the above. Rather than a tool for monitoring sustainable development, they recommend quality-of-life as the central subject. A choice for quality-of-life implies that a monitor measures how well people are able to fulfill their personal needs – how well they (can) take care of themselves, their family, their time and their world. A practical example of monitoring quality-of-life is documented in the city of Porto (Santos & Martins, 2007). The study shows how quantitative data from archives can be combined with self-reporting by citizens. Citizens are interviewed on their perception – these data are then mainly used to establish weight-factors addressing the importance of individual data-sets. The package participation/quality-of-life seems suited as a boundary object, because there are less sources of opposite interest and dispute.

Abandoning sustainability indicators as part of a monitor as boundary object does by no means have as a consequence that the subject of elsewhere and later is abandoned with it. This lies in the characteristics of a boundary object – a boundary object does not create or communicate knowledge. The dialogue or interaction around a boundary object is what supports learning processes. As Fischer (2004) put it:

“Boundary objects can be pointed at and named, helping stakeholders to incrementally increase their understanding,” and “Boundary objects allow different knowledge systems to communicate by providing a shared reference that is meaningful within both systems”. (Fischer, 2004).

With different knowledge systems, Fischer (2004) refers to different communities of practice (CoP). If representatives from more than one knowledge systems convene to address a subject of mutual interest, they become a “community of interest” (CoI). Within such a CoI a boundary object plays the role of a shared reference that is meaningful for all participants.

Communities of practice are often long existing entities with a name to be addressed by (biologists, electricians, rugby-players, soldiers, coin-collectors and so on). They perform different tasks, but all within the boundaries of their own domain. Within such large communities, there are sub-communities that in themselves are CoPs (soldiers can be marines; marines can be snipers and so on).

Although communities of interest could also long exist, they are often disbanded once a mutual target or goal is reached, or the mutual objective is accomplished. Wicked problems often involve legitimate perspectives from different angles, which require dialogue across the boundaries of different communities in order to find appropriate ways to act. Sustainable development and initiatives to improve quality-of-life are likely to address issues that require such dialogue. The variation of backgrounds of participants in a community of interest makes it harder to provide a meaningful reference for all intended participants. The choice of a boundary object is thus more crucial.
The concepts of here and now can provide a meaningful reference for many, but the potential of the concepts elsewhere and later show far less potential for that purpose. Sustainable development is therefore proposed as a desired outcome from a discussion taking place around a boundary object – not as the subject of the boundary object itself. Table 1 illustrates the differences between CoP and CoI.

Table 1. Differences between CoP and CoI, based on Fischer (2004).

<table>
<thead>
<tr>
<th>Nature of problems</th>
<th>Community of Practice</th>
<th>Community of Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Different tasks in the same domain – the common nominator of the community is to have knowledge and skills in the same domain</td>
<td>Common tasks across multiple domains – the common nominator of the community is striving for a mutual target, goal or objective</td>
</tr>
<tr>
<td>Knowledge development</td>
<td>Refinement of one knowledge system; new ideas coming from within the practice</td>
<td>Synthesis and mutual learning through the integration of multiple knowledge systems</td>
</tr>
<tr>
<td>Major objective</td>
<td>Codified knowledge, domain coverage</td>
<td>Shared understanding, making all voices heard</td>
</tr>
<tr>
<td>Weakness</td>
<td>Group-think</td>
<td>Lack of shared understanding</td>
</tr>
<tr>
<td>Strength</td>
<td>Shared formal representation of knowledge as a set of concepts within the domain, and the relationships between those concepts</td>
<td>Social creativity; diversity; making all voices heard</td>
</tr>
<tr>
<td>People</td>
<td>Beginners and experts; apprentices and masters</td>
<td>Stakeholders (owners of problems) from different domains</td>
</tr>
<tr>
<td>Learning</td>
<td>Legitimate peripheral participation – learning in an inward trajectory from masters in the domain with the intent to eventually become a master</td>
<td>Informed participation – learning is intended to find solutions to best meet the mutual target, objective or goal by combining perspectives</td>
</tr>
</tbody>
</table>

The above implies that a group of communities of practice could form various communities of interest around different subjects. Each of these groups could use the same boundary object, different boundary objects or different elements from the same boundary object. It also implies that a boundary object is not static – as shared understanding across spatial, temporal, conceptual or technological gaps develops and grows, the boundary object must grow and develop as well to continue fulfilling its purpose as a shared reference. In relation to rural resource management, Guijt (2008) offers similar advice.

“Approach monitoring as an evolving practice, thus allowing it to become a dynamic knowledge production process, which when subjected to regular critical reviews and adaptations retains relevance and usefulness” (Guijt, 2008).

Sub-conclusion

This section explored what existing or suggested applications of boundary object or related concepts are and if results, experiences or expectations of these applications are documented. The goal was to see if information can be derived from these observations with respect to features to support learning. A boundary object does not create knowledge by itself – the dialogue taking place around it does. For that reason a boundary object should not be seen as an end in itself, but as a tool.

The usability of the sustainability concept for a boundary object is doubtful for two reasons. First of all for a substantial part of the population, the subject of sustainability is not likely to be interesting enough to trigger participation in dialogue. A dialogue on the here and now – dimensions that are meaningful on the geographic and time scale of urban neighborhood development – are considered more likely to trigger dialogue. A second point is that sustainability can likely be in itself the subject of heated debate. That is in conflict with the definition of a boundary object. A boundary object is to bridge between groups. It should aid...
in a dialogue and not be the very thing that is debated. A Quality-of-Life monitor is thought to be able to fulfill that role.

Cross boundary learning requires that people engage in dialogue with representatives from other social groups. People belong to communities which in this study are referred to as communities of practice (or CoP). Learning in such communities is largely limited to passing on existing knowledge to new members. The type of learning required for sustainable development makes it necessary that people originating from a variation of CoPs engage in dialogue. Groups in which such dialogue takes place are referred to as communities of interest (or CoI). The step to leave the comfort of a CoP to engage in dialogue in an unknown CoI environment requires some level of social mobility. A boundary object should aid in taking that step by providing reference that is meaningful enough to overcome psychological barriers.

In order for learning to take place, innovation of monitoring processes is asked for. If monitoring and learning are to be combined, monitoring cannot be approached anymore as a pure data collection exercise. In order to prevent that parties feel excluded, they should be involved from the beginning, or at least at a point where input can still be taken into consideration. All stakeholders in a learning network should participate in the dialogue that leads to decisions on what to monitor and how to do it, in collecting data, in interpreting results, in adjusting the process, etc. This moves monitoring from historically an exclusively scientific effort to a participatory effort.
3.5 QoL Monitor in the SUN Project

Now that the concept of a boundary object is explored in relation to a multi-actor learning network, this section focuses on how a Quality-of-Life monitor can be implemented as a boundary object. At the time of this writing, the SUN project has not yet defined a set of indicators or taken other decisions with respect to monitoring. However, there are clear views of the challenges (or desired outcomes) of monitoring.

As mentioned in relation to the learning network in a previous chapter, an objective for monitoring is capturing data that can be compared across different neighborhoods whilst doing justice to the specific nature and culture of individual locations, should capture sustainability and should be interactive to capture stakeholder perceptions (SUN, 2010). This is a good starting point.

Valkering, Beumer and Van Zeijl-Rozema (2010) follow IVAM (2009) with their appreciation for an approach in which reference-neighborhoods provide some measure of “distance to travel”. The need to measure intra-urban differentiation (Santos & Martins, 2007) can point in a useful direction. Santos and Martins argue that simple average values cannot express quality-of-life in lands-of-contrasts as urban centers are. Different parts of a city must be monitored on minimal spatial distribution. Neighborhoods (parishes) are their spatial distribution of choice.

Neighborhoods are not an entity in itself – they are part of bigger structures such as city, region, country, climate zone and other, which affect the quality-of-life within the neighborhood, independent of, or in orchestration with, the conditions within that neighborhood. Comparing neighborhoods in different cities or countries with each other might thus result in a substantial amount of noise in the data. As the SUN project addresses neighborhoods in different countries this would affect the accuracy of efforts to compare the different neighborhoods.

The neighborhoods in the SUN project share a history of closure of old industries that shaped and constituted their character (Beumer, Valkering & Ruelle, 2010). They are referred to as “neglected neighborhoods”. This implies that the same city in which each of them is located also has neighborhoods that are not “neglected”. These non-neglected neighborhoods are prone to be subject to the same influence of regional and national factors that affect quality-of-life. In order to make the data comparable, a Quality-of-Life monitor could thus compare scores on indicators with a selected non-neglected neighborhoods (or an average of several) in the same city. With respect to a Quality-of-Life monitor, this would not only improve comparability of data, but would at the same time make data more meaningful for some of the stakeholders. That in turn can make it more effective as a boundary object and could aid in initiating participation and retention, which is the subject of a later section.

The desire to capture stakeholder perceptions fits well with the dual character of quality-of-life – a mix between objective and subjective indicators – as covered earlier, subjective well-being is best captured via self-reporting (Costanza et al., 2008). The way in which such data are captured largely depends on the number of mechanisms that must be in place to prevent “false reporting”. Self-reporting is always an instrument that produces data that should be handled with care. Brysbaert (2006) draws attention to a tendency to give socially/culturally appropriate answers, wrong perceptions of the issue at hand and doubts whether participants are representative for the target population (some groups are more likely to participate than others).

One option to reduce the risk of false reporting is an intermediate agent – this could be volunteers who collect data during interviews with inhabitants of neighborhoods. This is the technique that was chosen in Porto (Santos & Martins, 2007). There are some drawbacks in relation to this approach. The subjects of the study are less likely to have contact with the
instrument (the web-tool), which can be seen as a missed opportunity for participation, dialogue or interaction. Another point to be taken into consideration is the continuation of the project. Continuation after the funding period is less likely if active deployment of volunteers (or paid help) is needed to keep data-collection going.

A direct reporting option at the location of the web-tool can thus be seen as offering the advantage of direct interaction which can provide learning opportunities. It also increases chances that the project extends beyond its funding period. At the same time, it can mean that data-confidence is lower than it would be with intermediate agents. The internet cannot exclude reporting by subjects from outside the target neighborhood, cannot prevent multiple reporting by the same person, is always available regardless of the current mood of the subject, etc. The choice between reporting directly in the internet or via an intermediate agent is thus a matter of compromise. There is no choice that offers only advantages, but mechanisms that improve consistency can be put in place. Manual filtering of entered date before they actually go online is an example. A quote from Fischer and Oswald (2004) might provide some guidance for choices in case a dilemma arises between data confidence and stakeholder participation (and learning):

“[…] boundary objects are evolving artifacts that become understandable and meaningful as they are used, discussed, and refined. For this reason, boundary objects should be conceptualized as reminders that trigger knowledge, or as conversation pieces that ground shared understanding, rather than as containers of knowledge. The interaction around a boundary object is what creates and communicates knowledge, not the object itself” (Fischer & Ostwald, 2004).

Faced with a choice of (maybe only marginally) improving accuracy of data within a boundary object and increasing the chance that interaction and dialogue around the object increases, the answer is implied in the notion of what a boundary object is. A boundary object is meant to open and support a dialogue. That purpose is best served by self-reporting without the intervention of a mediating-agent. For this reason, the mediating-agent option is only maintained as a desirable addition, but abandoned as an exclusive means of data collection. A combination of personal reporting and reporting through a mediating agent remains a viable possibility. Such an approach was used in the SUN energy initiative in Genk, where inhabitants could monitor energy consumption themselves or could rely on help from trained energy masters (Valkering, 2010). The energy action is further explored in section 3.10.

Sub-conclusion
This chapter explored how a Quality-of-Life monitor can be implemented as a boundary object in the SUN learning network. Quality-of-life seems well suited as a concept in which many targeted and potential participants for dialogue are sufficiently interested. It is thought that this can be further improved by adapting the geographical scale of data collection. Comparing scores on indicators for a neglected neighborhood with a local reference – a true physical reference known to the stakeholders – makes data more meaningful and thus better suited as a subject of dialogue. How this can (technically) be done in a monitor is covered in a later section. At the same time, using a local non-neglected neighborhood as a reference is believed to reduce noise in the data when comparing neglected neighborhoods from different cities.

Subjective well-being and other data that can be individually monitored would be measured by a possibility to participate in an online poll, while data from official sources (mostly objective data) would be supplied and entered by the inner-circle of the learning network. At the same time, altering, adapting or fine-tuning the monitor should be possible – the indicators that are included, the “distance to travel” and other aspects – this is not only meant to account for new needs. It gives credit to the notion that a boundary object is an evolving artifact and that monitoring should become a participatory action in order to fulfill a substantial role in learning processes. If internet access is an issue, the (partial) use of intermediate agents could be considered to reach a broader public.
3.6 Initiating and Sustaining Participation

Next to language concerns, the challenge of initiating and sustaining participation in a multi-actor learning network is repeatedly mentioned in relation to the SUN project (De Kraker et al., 2009; Valkering, 2010). This brings up the question how a boundary object can fulfill a role for this issue. To accommodate that, this section explores what features or procedures of a Quality-of-Life monitor as a boundary object offer a promise of initiating and sustaining active participation and communication between various parties in the SUN project (including inhabitants, local authorities and scientists).

McCool and Stankey (2004) have reflected on that issue in a similar setting. They propose that the ambiance for participation must be created early – at the time of setting an objective and then selection of indicators. The scientific community tends to approach monitoring as a technical issue, but in relation to sustainability and quality-of-life the normative aspect should dominate – the normative issue is concerned with what should be measured, while the technical issue addresses what can be measured. McCool and Stankey (2004) argue that dominance of the scientific community in the beginning of a project involving monitoring positions science as the solution of that problem as well. If participation is desired, science should take a supporting role, rather than a dominating one. In their own words:

“Although organizing scientists, policy-makers, citizens, and decision-makers to participate in informal, learning-oriented discussions is difficult, it is a necessary element in establishing the common footing upon which informed decisions can be made. This dialogue provides the foundation for developing shared meanings of sustainability, the role of indicators, and how they will function in a policy context. Indeed, the complexity and uncertainty associated with moving toward sustainability demand such dialogue, deliberation, and learning” (McCool & Stankey, 2004).

The social, political and moral grounding is at least as critical as the scientific one. Emphasis on the scientific foundation of indicators is soon an overstatement and would communicate the message that the solution of sustainability issues is a scientific problem. Such a message would not likely aid in initiating or sustaining participation from entities outside of the scientific community. The notion that including the public in the process of selection of indicators provides an opportunity for community empowerment is also mentioned by Fraser et al. (2006). They pose that involving people in the selection processes of key indicators provides a valuable opportunity for both empowerment and for community education. In the field of community science, the importance of empowerment for continued participation is confirmed by the work of Wildermann, Barron and Imgrund (2004).

A note of dissonance can be taken from Holden (2006). She has taken an extensive look at the value of indicators for various actors in the “Sustainable Seattle” project. In relation to that project different approaches have been brought into practice. She compares three “indicator generations”, in which next generations were attempts to “fix” shortcomings in the previous one. This takes the role of indicators beyond the point of initiating and sustaining participation as it is explored here. The key lesson that can be taken from Holden’s work is that an indicator selection procedure based on broad public participation with the aim of empowerment and ownership comes with loss of usability of those indicators for other purposes. Examples are indicators that lack a direct link with the current political agenda, or that do not match with the mandates of different departments of the administration. This suggests that a project for sustainable urban neighborhood development (in this case the SUN project) could at times be in need of a second mechanism for measuring indicators.

The addressed notions are an indication that not only actions for activating engagement and sustaining active community membership are decisive for participation, but that content (such as a choice for indicators) is an important factor as well. If content is projecting a feeling of ownership and empowerment, it seems to be able to play a significant role in promoting participation. Inviting people to participate and stressing to them the importance of continued participation (processes for activating engagement) are not likely to succeed in the long run if chances to be heard, to have influence and to develop a feeling of ownership are absent or
too limited. Keulartz et al. (2004) refer to this as one of the most important features of a boundary object:

One of the most important features of the boundary object is that one group does not create or set the meaning of the object for other groups nor does one group regulate access to the object by other groups (Keulartz et al., 2004).

In addition to notions of ownership and empowerment, Wildermann, Barron and Imgrund (2004) state that isolation from other participants has a negative impact on continued participation. Isolation could be seen as a lack of social capital. Social capital refers to a network of strong and weak ties within communities and thus to avoiding isolation. It differs from natural or built capital in the sense that its stock (or value) tends to increase the more it is used (Costanza et al., 2008). This gives promoting an increase in social capital the status of “in-built sustainability”. With regard to a Quality-of-Life monitor and participation in a learning network, existing social structures might provide opportunities to attract groups of stakeholders to the network. This could attract individuals going along with their group who would be hard to reach as an individual.

Murphy (2007) has addressed that same question, but in relation to another subject – the role such structures can play in the management of catastrophic events. Nonetheless, the work is relevant because it provides a notion of what these existing structures in a neighborhood might be. Murphy quotes Grootaert (1998 as referred to in Murphy, 2007) with a definition of social capital:

“[The] set of norms, networks, and organizations through which people gain access to power and resources, and through which decision making and policy formulation occur” (Grootaert, 1998 as referred to in Murphy, 2007).

These networks and organizations are not so much embedded within government or economy, but are to be sought within the civil society. Examples include neighborhood watches, religious congregations, sports clubs and other interest or kinship based communities. The key message of Murphy (2007) is that reaching key people (or hubs) within existing social networks and organization means reaching entire groups of people in a target area. Given that isolation has a negative impact on retention of participants, this should not only aid in initiating participation, but should also help to assure continued active involvement. Since the boom of social web sites in recent years, the internet could be added as a potential host for such communities.

The role of the internet as a platform in which urban neighborhood communities are organized has been monitored in Poland (Jacek & Barosz, 2010). An interesting observation is the role the internet can play as an “intermediate step” in the development from passive bystander to somebody who is actively engaged in real-life action. In this quote, estate refers to a grouping of similar buildings (flats) within a neighborhood:

The Internet can serve as a medium that both integrates a neighborhood and stimulates estate-based contacts. Clearly, most forum participants can be said to be ‘interested’ rather than ‘engaged’ in estate matters. Still, through the Internet it is relatively easy to establish and develop contact, and then transfer it into the realm of real-life action (Jacek & Barosz, 2010).

For a Quality-of-Life monitor with respect to initiating and sustaining “active participation”, this would mean that such a tool should not only link with the intended multi-actor learning network. Social internet has developed to the point that many people stay in touch with friends, family, activities and whatever is of interest to them by frequent visits to their social, internet based platforms. Where a reminder might be needed to trigger repeat visits to a single-issue network, the more general social network is often visited as daily routine. In order to take benefit of such general social networks to foster sustained participation in the single issue network, links between the two could be established.
Such integration should be relatively easy to include, because most platforms for social internet offer several interface options that are intended for just that purpose. Facebook is an example in point. Next to common voting options, it allows giving recommendations which places a comment, page-content, a link and an image on the user pin-wall, and so on. An option to take into consideration is to synchronize login. A tool exists to combine login to a Facebook account with the login to other sites. This allows participants to do a single login for connecting to the two networks at once. Other social internet sites offer similar solutions and options. Although the use of these options only serves as reminders to visit the single-issue network, its use could very well increase the number of times people in a neighborhood are confronted with the monitor, which could aid for initiating participation, but also for retention of participation because it has the potential to limit a feeling of isolation.

**Sub-conclusion**

The question that was addressed in this section is as follows: What features/procedures of a Quality-of-Life monitor as a boundary object offer a promise of initiating and sustaining active participation and communication between various parties in the SUN project (including inhabitants, local authorities and scientists)?

It was found that feelings of ownership and empowerment count and that such feelings are positively related to early participation in the process of establishing indicators to be monitored. Essentially it means that participatory monitoring of indicators includes a say in what the indicators are, how they are measured and to what standard results are to be compared. This imposes a rather big degree of flexibility in the technical set-up of a monitor, which is the subject of a later section.

Another finding is that both initiating and sustaining participation can benefit from integration of the network (and with that the boundary object) with existing structures within the targeted neighborhoods. Motivating well-connected and respected persons within a neighborhood (referred to as hubs) can aid to attract the participation of entire groups. The finding that internet can very well serve as a first step, resulting in real-life contact and participation indicates that initiating participation is an important step. Linking with existing social internet networks can also help to sustain participation. Visiting single issue platforms might require reminders, but general social internet platforms are visited routinely – often on a daily basis. Most social internet platforms have interfaces for linking with other platforms. Using them means that participants are confronted with reminders to re-visit the single-issue site.

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3 This tool (and several others) is explained in the developer pages from Facebook on http://developers.facebook.com/docs/guides/web/#login
3.7 Learning Opportunities

The last, but important, aspect to explore is what features/procedures of a Quality-of-Life monitor offer a promise to support learning processes in terms of the shared creation of new knowledge, as well as exchange of existing knowledge and what conditions should be met to materialize the promise.

Learning leads to an increase in knowledge and understanding (or skills). Regarding knowledge, there are three major epistemological traditions – objectivism, pragmatism and interpretivism. They differ in their assumptions about reality and the source of knowledge. Objectivists view reality to be objective – true knowledge of the world is possible and experience (not reason) is the source of all knowledge. Interpretivists hold contrasting views – to them knowledge comes from reason, while reality is constructed and multiple. Truth is not singular, because everybody has (and is entitled to) his own interpretations. Pragmatism takes a sort of an intermediate position (Driscoll, 2004).

If an environment (in real life or in the internet) is intentionally designed and organized to trigger and support learning, the term education will be used. Each epistemological tradition has its own requirements. Education that leads to learning in the objectivist tradition requires a source of information for true knowledge of the world – a teacher. It is the teacher who decides on the content to be passed on. Educational traditions based on the epistemology of objectivism include behaviorism and CIP (Cognitive Information Processing) (also see appendix C). The web-based learning platform Learn4SUN certainly offers opportunities for such types of knowledge transfer. Especially part of the communication from the core of the network toward parties in the outer circles could very well be shaped in this top-down approach to education.

But, although top-down communication could become a practice within Learn4SUN, it is of little (if any) consequence for features and/or procedures of a Quality-of-Life monitor. The outcome of monitoring quality of life depends on many factors - especially if monitoring is geared toward seeking surprise, rather than documenting the anticipated (Guijt, 2008). This conflicts with education in the objectivist tradition. Education in the objectivist tradition is defined by the person assuming the role of teacher. When knowledge is viewed as existing and being a representation of the true world (Driscoll, 2004), a multi-actor dialogue is redundant. In that tradition, it is the teacher who defines what knowledge is going to be passed on, or when. As a boundary object is not a container of knowledge, its use in objectivist learning is limited to that of an example or training aid. For that reason, objectivist learning will not be further explored.

Constructivism⁴ views learning as a social process. Learning (the construction of knowledge) takes place in the mind. Depending on how strict objectivism is excluded, constructivism can be related to an interpretivist or pragmatic tradition. Every individual has certain knowledge constructs – schemas. These differ from person to person. Where learning in school is often related to objectivism, learning in day-to-day life and at work is more conveniently related to constructivism. In that case learning takes place where knowledge is going to be used later. This is called situated cognition (one variation of constructivism). Elsbach, Barr and Hargadon (2005) propose a framework to explain situated cognition in organizations. They place the cognitive process of sense making in between sources and results. The sources are existing schemas and the organizational context, while the result is the momentary situated cognition. The momentary cognition however immediately becomes part of an

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⁴ The term constructivism may cause some confusion. It was originally introduced by Piaget, who entertained objectivist views on learning. The term constructivism can also be found in use as a “new” epistemological tradition. In this text, constructivism is used as it is established in the psychology of learning and instruction as documented by Driscoll (2004) – an umbrella term for educational approaches based on interpretivist and pragmatist epistemologies, placing learning in a social dimension.
existing schema and makes place for a next momentary cognition. They thus view cognitions as temporary or transitional constructs. An environment rich in momentary cognitions should in that view enrich individual knowledge constructs.

The constructivist view implies that (social) interaction leads to learning and that increasing the number and duration of contact moments between different people and situations would increase the number of learning opportunities. A network based on the constructivist tradition would thus try to bring people in contact and animate dialogue between them to support learning processes. The same person can (simultaneously or time-delayed) fulfill different roles. People can both be provider and consumer of knowledge. They can also participate in dialogues leading to combine knowledge from different sources. In this case such discussion groups construct new knowledge – individual processes are combined to initiate shared understanding. This means that a first set of features to support learning was already addressed in the previous chapter. If learning is a social process, the number of interactions and the variation in legitimate perspectives expressed, enriches the learning process. Initiating and sustaining participation directly affects learning.

In section 3.2, it was argued that learning for sustainable development takes place in extended peer communities, combining a plurality of legitimate perspectives (Funtowicz & Ravetz, 1983). Such a community holds the characteristics of a CoI (Fischer, 2004). Seeking features and procedures for monitoring in relation to learning, requires a closer look at any relationships between the two. To do this, table 2 explores associations between a quote from Guijt (2008) from section 3.4 and the characteristics of a CoI.

Table 2. CoI based on Fischer (2004), related to requirements for monitoring innovation to enable learning according to Guijt (2008).

<table>
<thead>
<tr>
<th>Nature of problems</th>
<th>Community of Interest (Fischer, 2004)</th>
<th>Innovation requirements (Guijt, 2008) showing some level of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of problems</td>
<td>Common tasks across multiple domains – the common nominator of the community is striving for a mutual target, goal or objective</td>
<td>Essential for impact (not just a contractual obligation)</td>
</tr>
<tr>
<td>Knowledge development</td>
<td>Synthesis and mutual learning through the integration of multiple knowledge systems</td>
<td>Distributed (not centralized) as well as dialogical (not only a singular rationality)</td>
</tr>
<tr>
<td>Major objective</td>
<td>Shared understanding, making all voices heard</td>
<td>Sustaining collective cognition (not only the tracking of implementation)</td>
</tr>
<tr>
<td>Weakness</td>
<td>Lack of shared understanding</td>
<td>Pitfalls of monitoring tradition – contractual obligations, hope of omniscience, tracking of implementation, etc.</td>
</tr>
<tr>
<td>Strength</td>
<td>Social creativity; diversity; making all voices heard</td>
<td>Relationships and heuristics (not only through data and the hope of omniscience)</td>
</tr>
<tr>
<td>People</td>
<td>Stakeholders (owners of problems) from different domains</td>
<td>Multi-ontological (not only assuming an ordered universe)</td>
</tr>
<tr>
<td>Learning</td>
<td>Informed participation – learning is intended to find solutions to best meet the mutual target, objective or goal by combining perspectives</td>
<td>Essential for impact (not just a contractual obligation); seeking surprise (not only documenting the anticipated)</td>
</tr>
</tbody>
</table>

Reminder of quote in chapter 3.4 - „Monitoring requires innovation if it is to contribute to its much lauded potential to enable learning. A shift is needed to see monitoring as: dialogical (not only a singular rationality), multi-ontological (not only assuming an ordered universe), distributed (not centralized), functioning through relationships and heuristics (not only through data and the hope of omniscience), essential for impact (not just a contractual obligation), sustaining collective cognition (not only the tracking of implementation), and seeking surprise (not only documenting the anticipated)“ (Guijt, 2008).
Table 2 shows a strong link between the characteristics of a community of interest (the type of community found to be best suited for learning processes related to sustainable development) and the approach to monitoring as advocated by Guijt (2008).

After initiating (and sustaining) participation, which was the subject of section 3.6, a next step is thus required to assure learning processes that are considered best suited for sustainability related subjects. To do this, participants should progress from CoP to Col. This implies a network with two fundamentally different types of groups - groups sharing socially meaningful characteristics and groups sharing a mutual target, goal or objective. It is recognized that groups can fall outside this classification and that overlap is possible, but for the sake of clarity, the two types will be addressed separately. The term CoP will be used for groups that reflect existing social structures and Col for groups tackling a specific issue (also see section 3.4).

The step from CoP to Col is not a spontaneous process. For some people, the psychological hurdle to move beyond the boundaries of the social groups to which they belong is bigger than for others. This is referred to as social mobility. Feelings of uncertainty and concern often arise when people interact with novel groups (Smith & Mackie, 2007). Feelings of connectedness and mastery of a situation are an important reason why people are more comfortable staying within the boundaries of their own social groups, including the communities of practice to which they feel they belong. For many, this means that a psychological hurdle exists toward joining a new and thus unfamiliar group. Communities of interest integrate representatives from multiple domains. This diversity (at least initially) makes feelings of connectedness and mastery of the situation unlikely, if not contra-intuitive.

Communities of interest are formed with the intent to join forces for a mutual target, goal or objective. They give shape to the rich learning environments that are seen as essential for tackling issues related to quality-of-life and sustainable development. It can however be imagined that only people who already strongly identify with the goals of such a group take the hurdle of actually joining directly. Groups consisting exclusively of participants already strongly identifying with an issue could lead to less rich learning environments. Such groups are missing out on the legitimate perspectives of those who identify less with the issue.

Just like initial participation (enter the network via existing social structures) also the progress from CoP to Col should thus offer an option of gradual integration. This may not be needed for stakeholders strongly identifying with an issue, scientists (who are assigned to the task), politicians (who may have other motivations) or experts and local suppliers (who may be commercially interested), but it does apply to large groups of local stakeholders. Gradual integration could, for example, be facilitated by boundary workers – people maintaining active membership in several communities. They can take a pro-active approach to build rapport with people in one community and then introduce them to another. Also existing members of a Col can help. They can react to related posts outside of their CoP and engage in dialogue that is gradually moved toward Col membership.

The design of the Quality-of-Life monitor can also play a role. Following Guijt (2008), the approach to monitoring should be an innovative one. It should not be geared toward just fulfilling contractual obligations, not be centralized, not focus on a singular reality, not be organized with only reliable data-output in mind, nor meant for tracking progress only. A key element should be to aim at cognitive dissonance (Guijt, 2008). If monitoring data generate surprise, they are much more likely to trigger dialogue than when they confirm the obvious. Cognitive dissonance and the related dialogue make a step from a CoP to Col more likely. A lack of feelings of connectedness and mastery explain why people prefer to stay within their (psychological) comfort zone, but it should not be seen as either/or mechanism (Smith & Mackie, 2007). Reward or motivation can make passing the psychological hurdle acceptable. Cognitive dissonance could provide such an incentive. It can trigger the urge or motivation to
express an opinion, which in turn can be rewarded by others expressing agreement. Creating surprise is related to a careful choice of indicators to be included in the monitor.

A first step in progressing toward a CoI is to know that it exists. Such information can be included in a monitor. The design of the monitor should allow groups to adopt one or more indicators. When the adopted indicators are viewed in the Quality-of-Life monitor, the latest dialogue of the respective group could be shown at the side or under the data (graph). A “join the group” or “request group membership” button could be added as a direct incentive to go a step further. Gradual transition is assured because an interested person could follow dialogue for some time before actually feeling comfortable taking the step.

In relation to the Learn4SUN network platform De Kraker et al. (2010) envisions a web-based learning platform that is characterized by diversity, autonomy, interactivity and openness. Such a network allows participants to be both provider and consumer of information. It is self-organizing in the sense that participation is related to motivation and that there are options to create or participate in various groups. Such a network has only minimal barriers that restrict participation. It also has little top-down guidance. Although the mechanisms described in the previous paragraphs do not assure that those who are not personally invited to join a group (CoI) can find their way via peers, they do increase chances that this will happen. Participation in a CoP is beneficial in itself, but should mostly be viewed as starting point to progress further into the network. Within a CoP participants get and offer information and take part in dialogue. The goal however is to have stakeholders engaging in dialogue including a plurality of legitimate perspectives. The CoI is the place where this richer dialogue is to be expected.

The above positions a Quality-of-Life monitor at the center of a variety of processes that are essentially different. The question is if a single object can fulfill different roles. Edwards (2005) has studied learning around boundary objects (and in what he calls hybrid spaces). Context in which learning takes place has traditionally been conceptualized as sort of a container (classroom, book, curriculum or other). If learning processes across life are to be identified, another conceptual framing is required. Such conceptual framing has not yet matured, but is drawn upon concepts of communities, networks and other activity systems, rather than the traditional “container view”. In this view, networks, boundary objects, communities and other are not related to a specific type of learning, but simply another conceptualization of the context in which learning takes place. In this relation, a quote from Edwards (2005) is in place:

“Boundary objects circulate through networks playing different roles in different situations”
(Edwards, 2005).

Sub-conclusion
This section had the aim to explore what features/procedures of a Quality-of-Life monitor offer a promise to support learning processes in terms of the shared creation of new knowledge, as well as exchange of existing knowledge and what conditions should be met to materialize the promise. It was found that a Quality-of-Life monitor has little to offer for the transfer of existing knowledge. Such knowledge transfer is based on the objectivist tradition which assumes a teacher/student relationship. For the transfer of true knowledge of the world, a boundary object can only play a minimum role, because its content is unpredictable and therefor of little value for learning of pre-defined content.

People feel more comfortable amongst peers. It is likely that initial interaction within the network is within a familiar group. Such a group would have the characteristics of a CoP. Plurality of perspective is likely to be less than in communities of interest, groups shaped around a subject, attracting participants from a variety of groups. Learning in the sense of constructivism depends on social interaction and richness of dialogue. An important role of a boundary object is thus to support to progress from CoP to CoI.
To assure rich dialogue and intensive learning experiences within the various communities of interest, cognitive dissonance is an important notion. Indicators can be deliberately selected to seek surprising results, rather than just documenting the obvious. The view on monitoring as suggested by Guijt (2008) in relation to participatory monitoring in rural resource management seems to be equally promising for urban neighborhood development.
3.8 Schematic Representation

This section rounds up the findings in the previous sections by addressing what a schematic representation of a Quality-of-Life monitor incorporating the identified features would look like and what the options are to integrate such a function in a multi-actor learning network for sustainable urban neighborhood development. One example of a possible design of a monitor is provided. It should not be seen as a “final product”, but rather as a starting point for dialogue on design decisions.

Quality-of-Life Monitor for XYZ neighborhood

Sort on:
- score + weight factor + combination
- Attachment to XYZ
- km²/km² lawn or park
- National pride
- Trust others in XYZ
- Traffic situation
- Income level in XYZ

Show more Indicators

This monitor compares indicators for Quality-of-Life in XYZ neighborhood with the rest of the City of ABC. Select the indicators you want to see – the weight factor is represented by the width of the bar and indicates how important inhabitants rate the specific indicator.

Figure 5. One possible display for a Quality-of-Life monitor, showing processed data fed from a database.

It is beyond the scope of this study to explore multiple available options for design of a Quality-of-Life monitor and its relation with a multi-actor learning network. However – the exploration of considerations and limitations in the previous sections would not be complete without at least one “concrete” example. This section is intended for that purpose and shows one (of probably numerous thinkable) option to combine the findings that were presented thus far. In this example it is assumed that the SUN learning network is structured as presented in Figure 4.

A simplified screenshot is shown in figure 5 and 6. Figure 5 could be the initial display of the monitor. The indicators shown are taken from the office for research and statistics in Heerlen (Parkstad Limburg, 2009). In the figures 5 and 6 they have an illustrative function only. The program should be set to only show a reasonable amount of indicators (based on computer-screen size), but offer the option to show more (see figure 5). When clicking on any of the individual “score bars” a new window opens in which a time series for the selected indicator is shown. A glossary function could be taken into consideration to support learning in the objectivist tradition, if that would be desired – when moving the mouse over an indicator it could show a short explanation on the reason for that indicator and provide an option to open a page with more information on the specific indicator. Another option would be short text or buttons inviting to learn more. This is a common function already in use (as an example) with many of the “ecological footprint” calculators available in the internet.

5 Ecological footprint calculators in the internet are used to create awareness among the public with respect to the ecological impact of their lifestyle. The number of such tools in the internet is big, but not stable. A current direct link to such a tool might become a “dead link” by the time it is used. A search engine term “footprint calculator” provides sufficient hits to see appropriate examples.
In this example of a monitor a score of 100% would be the value scored for the same indicator in non-neglected neighborhoods in the same city. The score thus represents the “distance to travel” for a neglected neighborhood to become a non-neglected neighborhood. The proposed system is generic and could thus also be used on other scales, such as individual streets or entire cities or countries. Although it would be possible to allow a choice of different benchmark marks, that might make the default start screen too complex. As shown later, such an option can be provided for individual indicators. Orange score bars represent data that were collected from the public (mostly subjective indicators), while purple score bars represent data from the local administration (mostly objective indicators). There could be an option to show both sets of indicators (as illustrated in figure 5), or to filter for only one set of data (poll or data from existing archives). In this example, the width of the bar represents a weight-factor assigned according to entries by local stakeholders. Scores could range from a minimum to a maximum (for example 1 to 5) and the width of the bar is then represented by an assigned number of pixels (see appendix B for a technical explanation).

The tool could be made interactive by allowing sorting indicators. A user could be allowed to sort by criteria such as highest scores, lowest scores, weight factors, a combination of the two (in which the score bars with the biggest surface of combined length and width would be the sorting criteria) or any other sequencing deemed relevant. A button could invite participation in opening a questionnaire – clicking the “include your opinion” button would direct the visitor to the poll that allows answering the included questions on scores and importance of indicators. The time series could be made interactive with (as an example) an option to compare the data with another indicator or the same indicator in another neighborhood. This could be operated by a drop-down selection field.

To have flexibility in adding data in the future, the tool could include the option to add or delete indicators. If data would be collected in a city-wide project, a system based on collecting data in an internet-hosted database could also be made more generic (at the start or in the future). One could imagine offering free choice of a reference neighborhood (the one that defines the 100% score) and the neighborhood to be scored (the one defining the length and width of the bars).
Figure 7 illustrates an option for the positioning of a Quality-of-Life monitor in relation to the Learn4SUN platform. As the boundary object is meant to initiate and sustain discussion, it would be positioned at the outskirts of the platform – the part of the platform that is publicly accessible in full functionality (not only visible). This could be the platform itself if it is technically possible to allow full functionality to those who are neither registered nor logged in. It could also be an entirely different page, but linked to the platform in several ways. Such a page could for example include a field with the most recent posts in the platform in relation to the monitor. This could be combined with an invitation to register as a member of the network.

Entering existing data (in this set-up data on indicators that are not part of a poll) would be reserved to the inner circle. The tool would allow them to add indicators to the monitor and enter the data available for that indicator. This in turn could trigger an option in the subjective data entering (stakeholder participation) to assign a weight-factor to the new indicator. An invitation to do so could be sent to active participants in the network. The criterion could also simply be added to a questionnaire meant to collect self-reported data. Self-reported data could be collected via a poll. Stakeholders could be invited to complete an internet based form. This would ask both scores on weight factors on all indicators, as well as data/opinion on what would likely be mostly subjective indicators. The data would automatically be entered in the database and integrated in the values the next time somebody visits the monitor. Intermediate agents might be a solution when it is anticipated that a larger segment of inhabitants do not have access to internet.

Within the network, the monitor with all its data serves as a boundary object to trigger dialogue. Communities of interest could “adopt” indicators linked to the subject they are concerned with. The monitor in turn could include the field with recent dialogue taking place in the group that is linked with the indicator being visited. The interaction (links) between CoI
and monitor serves to spark dialogue. Attention is drawn to whom (which group) is addressing any problems related to the indicator of interest. The dialogue itself takes shape as it is explored in the previous chapter, consisting of a constructive general discussion combined with the presence of specialists in various fields who could be consulted for specific information needs (mostly from the core of the network) should the need arise.

The stakeholders in the core of the network could maintain relations with the local press to keep them informed of the progress. Press coverage in turn could motivate new participants. Local organizations, such as religious congregations, sports clubs, schools and others can be asked to motivate those in their circles to participate in a poll in the monitor in the sense that they make their voice heard. Leaders of such groups could become hubs in the network. In the same manner, popular social networks such as Facebook or Twitter can be used to make the existence of the monitor better known to the target public.

**Sub-conclusion**
This section explored what a schematic representation of a Quality-of-Life monitor incorporating the identified features could look like and what the options are to integrate such a function in a multi-actor learning network platform for sustainable urban development. Considering findings in previous chapters, a dynamic character and flexibility to adapt the monitor to respect outcomes of dialogue are essential elements. The established importance of giving a feeling of ownership, of not giving groups the feeling of being excluded and in establishing a feeling that each opinion matters should be represented in the design of a Quality-of-Life monitor. As mentioned at the beginning of this chapter, there are several options to do this. The example provided here thus only serves as a starting-point for dialogue. It does however show that there are practical ways (or at least one) to translate the conclusions of previous chapters into a tangible tool.
3.9 Technical Framework

Now that a concrete example of a Quality-of-Life monitor is explored, it is of interest what technical options and constraints should be kept in mind for its design. Regarding technical limitations for its implementation as an internet tool, Daniel Haug from WorldService (Haug, personal communication, January 4, 2011) has a short answer: basically anything is possible with respect to collecting, sorting and representing data in the internet (See appendix B for a protocol of the interview). The limits are not so much to be sought in the field of what can be done, but more in the field of cost-effectiveness, compatibility with a variation of user hardware and time-effectiveness. As an example Haug mentions the use of Flash (software used to make internet pages) as a compatibility issue – if you use Flash, users of the most-sold tablet computer will not be able to use your internet page anymore.

Tablet computers, such as the iPad (a product released by Apple in 2010) are related to the current increase in mobile use of the internet. A Google search (02-12-2010) on “mobile internet growth” returns more than 27 million hits. A random selection of 20 of these hits showed 100% consistency in reporting spectacular growth, including a market penetration of 20% to be reached by the end of 2010. This indicates that tools created today could potentially increase their life-span (the time during which they can be considered relevant) if mobile options and restrictions are taken into consideration. Such consideration include refraining from the use of Flash (as does the Elgg social networking engine), adapting functionality (buttons, fields to entry data, etc.) to allow touch-screen application, dynamic page width to adapt to a variation of screen sizes, as well as simple graphics that are “easy-to-read” on small computer screens (Haug, personal communication, January 4, 2011).

Sub-conclusion

The answer to the question what technical options and constraints should be kept in mind for the design of a Quality-of-Life monitor is short: technically a monitor as introduced in the previous chapter should be feasible. The expert’s statement that “anything is possible” in this respect gives good hope that this will also apply to an adapted version of the monitor as an outcome of a dialogue on the final design. According to the consulted expert, the main considerations are budget constraints and the time that can be allowed for development.
3.10 Exploring an Example – Energy Consumption

The SUN Project has four “core actions”, of which the energy action is one. According to Valkering et al. (2010) the action has four specific aims. These are 1.) improving the energy performance of 200 or more dwellings in participating neighborhoods, 2.) set up a pool of energy contractors, 3.) raise awareness about global warming and energy consumption of residential buildings and 4.) inspire initiatives for renovating houses. All of these aims are applied to the geographical region addressed by the project. The energy action has its place in the core of the SUN learning network (Figure 4). This chapter explores how findings in the previous chapters could be applied to Communities of Interest addressing issues relating to the energy action (or the action as a whole). It explores the role the Quality-of-Life monitor can play as a boundary object in learning processes related to the energy action.

Energy use primarily represents a flow of benefit originating from natural capital. Making use of this benefit can lead to an objective increase in quality-of-life. Since energy is a key commodity in today’s society, it has an influence on many constituents of quality-of-life. This ranges from the comfort of having a warm house, via health by excluding moisture from that same house and the availability of heated food, to luxury related issues such as sufficient light, watching television and so on. One could expect that a high standard of quality-of-life would also result in a perception of need-fulfillment and thus an increase in subjective quality-of-life.

However, it is just as likely that at least some of the stakeholders take the unlimited availability of energy simply for granted. In that case an influence on perception of need-fulfillment would be minimal at best. It could also be expected that there are others who find satisfaction in taking action for the greater good – doing their share in efforts to reduce energy consumption here and now for the good of future generations, the climate or people elsewhere. This chapter is written under the assumption that a robust basis for the energy action requires both groups (and many others) to engage in dialogue, as all are stakeholders in the same setting. For the same reasons it is also assumed that attracting people to participate in dialogue on the basis of a declared goal – improving energy performance – would be counterproductive, because that could result in pre-selection of those who are already in support of that goal.

On the assumption that learning for the energy-action can very well start within the Learn4SUN network, even when it was not initially the reason to join the network, a boundary object should address subjects to which many stakeholders can relate. As perception of need-fulfillment is related to social norms and the way people envision their own situation (Costanza, 2008), exchange (and thus learning) within the network, can change views and thus the perception of what is desirable. This makes motivation to join the web-based network a first step. It can be imagined that subjects related to perceived need fulfillment (or subjective quality-of-life) are useful for getting stakeholder attention. Where an objective increase in quality-of-life can very well be taken for granted (and thus not serve as a basis for dialogue), a perception of quality-of-life (subjective indicators) is (more) likely to trigger feelings of a want or need to express views on the issue. Such indicators can be directly related to energy (such as the perception if energy prices are reasonable), or indirectly in relation to insolation (such as noise pollution of street sounds inside the house).

Expressing opinion and engaging in dialogue by becoming an active participant in the network is counteracted by feelings of uncertainty related to entering an unfamiliar environment with people one does not know. A desire to express opinion may not be strong enough to pass the psychological threshold to join. A smooth transition toward joining an energy action related Community of Interest might be supported by a path that takes it one step at a time. If the network offers space for existing social structures to form web-based communities reflecting real-life groups, a more gradual entry toward energy related CoI becomes a possibility. This is why local sports clubs, churches, schools and other should be
motivated to create communities (called Communities of Practice) within the web-based learning platform Learn4SUN.

Within such a community, there are those who are well-informed because of the intensity they engage with in neighborhood issues, because of their relationships with local administration or companies, or for other reasons. Others are novices and learn more about what is going on in their neighborhood while active in the network. The notions of Jacek and Barosz (2010) indicate that this can be a first step for active engagement in real-life action.

The above implies three requirements for a Quality-of-Life monitor. 1) The monitor must be visible (and operational with full functionality) for all potential stakeholders. People might visit a monitor and observe dialogue several times before actually registering for participation. 2) The monitor must provide links to the relevant CoI to let observers know where a specific issue is addressed. 3) The monitor must also be suitable as a social object – a conversation topic between friends, neighbors, etc. Since smartphones are increasingly used as social objects – handing around and discussing pictures, internet-pages or videos with friends (personal observations) – functionality and resolution of such hardware should be taken into account in the design.

Self-reporting is an important tool. Subjective indicators allow people to express their perception and/or opinion. The same holds true for assigning weight factors to indicators. This makes an online poll useful both for collecting data and for initiating (and sustaining) participation. Subjective indicators measure perception, but can be geared toward energy related issues. Examples include:

- How do you rate the quality of the heating system in your house?
- Do you consider the temperature in your house comfortable?
- Is your house sufficiently isolated to avoid draft?
- How much do you pay for heating every month? Do you consider this amount high, or low?
- How would you rate the average energy efficiency in the neighborhood?
- How would you rate the energy-awareness in the neighborhood?

With respect to social internet (or web 2.0) there is another aspect to keep in mind with respect to the choice of indicators. Joining a network is not the same as signing up for school, a class or a course. People do not join networks with the sole intent to learn. Earlier expressed notions about ownership, empowerment and not feeling excluded from the debate or related decisions play an important role. This requires the monitor to be flexible in adding or deleting indicators or varying thresholds. Sustaining dialogue within communities of interest (as well as in communities of practice) requires surprise. Confirming the obvious or re-confirming data found the year before can prove to be insufficient to keep all parties interested. To avoid this, indicators should be both a trigger of dialogue and the result of dialogue.

The above would envision the second sphere in the network to consist of multiple communities with CoP characteristics. Each of them communicating in their own language on subjects of shared understanding and interest. From these communities, individuals can develop motivation to participate in other groups in the same network. Such groups would evolve around single-topic issues and would contain elements (stakeholders) from different communities of practice. These single-issue communities are markedly different from the neighborhood-specific groups. They involve integration of multiple knowledge systems, aim to develop shared understanding and view the same subject from different angles, particular to multiple domains. These are groups that have characteristics of a community of interest. In these communities, real and perceived boundaries are crossed, which places the Quality-of-Life monitor in the role of a boundary object. A field with “latest activity” can serve for “recruiting purposes”. A CoI would adopt one or more indicators, which are linked to the
dialogue taking place in that group. Stakeholders who are already active in the web-based learning platform (CoP or other CoI) are more likely to take the step of joining.

Where communities of practice have initiating and sustaining participation in the network as a main purpose, it can be expected that the single issue groups are the location where most learning is taking place. Initial learning – even if it only were the functioning of Learn4SUN features – can take place in the (sub)neighborhood-groups. These communities mix social interaction with distribution of information. Concrete real-life action is likely limited to meeting network contacts or joining announced meetings. The single-issue groups – since they work across barriers – are likely to shift the emphasis to include less purely social interaction and more sharing of information and integrating knowledge systems. An example of the path from CoP to CoI is illustrated in figure 8.

![Diagram](image)

**Figure 8** – the relationship between CoP and CoI in which the CoP serves as an intermediate step to reduce the psychological hurdle related to joining a CoI immediately.

Although CoIs could form on the initiative of stakeholders in the second sphere of the network, in the case of a pre-defined action, such as the energy-action, this would mean that one or more such groups are established by members from the core of the network. Groups could form around subjects such as domestic energy-use; the role individual households can play in relation to global-warming, or other. Both for CoI set-up by the network-core and for groups that form more spontaneously, the Quality-of-Life monitor could aid in recruiting of participants by allowing groups to “adopt” indicators that are then linked to the dialogue in the group.
To function as a boundary object, the monitor must provide a notion of common ground – a subject of conversation that is inviting and interesting for dialogue for parties at different sides of boundaries. This does not mean that they have to agree on the subject, only that it represents a topic of interest for all intended parties. At the same time, indicators must be sufficiently meaningful and interesting if they are to support prolonged dialogue. To make an indicator meaningful, it must be compared to a meaningful reference. In the case of neglected urban neighborhoods, this could be a reference neighborhood in the same city. In relation to the energy action, this could for example include a metric of energy consumption per household compared to a reference of households in non-neglected neighborhoods.

Such data could be pulled from other actions within the SUN project that result in documentation of data. In this case the web page for the energy-challenge. That particular page allows inhabitants to monitor their energy consumption and compare it to a standard. Energy masters (inhabitants who received training on the issue) can then offer advice on improving performance. The data in the monitor would be averaged, but linking the two systems would provide an opening to invite more stakeholders for individual participation (either by themselves or via an energy master (Valkering, 2010) participating in the group).

To make indicators interesting, they should be selected to seek surprise, rather than just documenting the obvious. Measuring feelings of attachment to a (neglected) neighborhood is more likely to provide counter-intuitive outcome than measuring income level if compared to other (non-neglected) neighborhoods.

Also within single-issue groups, the notions of empowerment, ownership and not being excluded must be kept in mind. A group can very well be formed around a goal (an end), but attention must be paid not to link means and ends prematurely. The ideas behind a community of interest include the integration of multiple knowledge systems, to make all voices heard, to develop shared understanding and to support social creativity. Such notions are lost when a single stakeholder sets the meaning of a boundary object (Keulartz et al., 2004).

Combining means and ends before the actual debate starts would thus ignore important features of a boundary object. Regarding domestic energy use, a negative example could be linking metrics for electricity use in local households with data for the number of households using energy-saving light-bulbs. Offering such a package of means and ends would not enrich the discussion taking place around it, but would rather narrow it. It could obscure paths to other (maybe more efficient) avenues toward the same end.

From the introduction of this section, it can be taken that the energy action has defined specific goals. Pre-defining the number of houses that are to be insulated as a result of the project could convey a message that the discussion is already finished even before it has started. This reflects the top-down approach that stands in contrast with the post-normal science with a plurality of legitimate perspectives that is advocated for sustainable development. The desire to make the neighborhood more energy efficient (the end) has already been attached to the best way to do it – insulating houses (the means). An iterative dialogue moving toward sustainable urban neighborhood development could be better served by introducing goals (ends) only. In the discussion, different avenues to reach that goal can then be discussed, which leads to learning for the various parties involved and at the same time could result in innovative ways to reach the common goal.

Although means and ends packages should not be set-up prematurely, it can very well be imagined that the outcome of a discussion in a group is translated into action. In such cases a desire to measure success can be anticipated. To support such requests, there should be a possibility for groups to propose indicators to be added to the monitor. For reasons of uniformity and to prevent erroneous manipulations of the software, the technical implementation is probably to be done by the network core.
4. General Discussion & Conclusions

Integration of sub-conclusions

Learning for sustainable development can be viewed as a multi-actor process. Dialogue (and thus learning) depends on a topic or object that is meaningful for all intended parties. Social groups consist of one or more people sharing a socially relevant characteristic. Within such groups, dialogue takes shape around a social object. People belong to different social groups, but social objects are normally relevant in a single group only. Multi-actor learning processes aim at robust solutions, which requires the integration of diverse (legitimate) perspectives and types of knowledge.

Heterogeneous actor network are in need of a social object that is meaningful for people originating from a variety of social groups. Social objects that have the capacity to bridge perceptual and practical differences among diverse communities are called boundary objects. Discovering shared interest of all parties intended to participate in dialogue is the first (and essential) step toward the design of an effective boundary object. Monitoring of quality-of-life is thought to provide meaning for the diverse groups expected to participate in efforts for sustainable urban neighborhood development.

The most intuitive function of a Quality-of-Life monitor is monitoring. Although this study does pay attention to monitoring to collect reliable data, the emphasis is placed on the challenge of using a Quality-of-Life monitor as a boundary object to support learning processes in a multi-actor web-based learning platform – specifically the use of a Quality-of-Life monitor in the Learn4SUN platform. That network has a self-organizing structure in which a clear hierarchy is absent. Within the network, every participant can be both provider and consumer of information. They can join existing groups or create new groups and define with whom they want to engage in dialogue and who can read their information.

Groups within a self-organizing network can take two fundamentally different shapes. Online groups can become a reflection of existing social groups in the community. This is referred to as a community of practice or CoP. Groups can also shape around an objective, target or goal and consist of people originating from a variety of social groups. Such groups are referred to as community of interest or CoI. The rich learning environments sought for with respect to sustainable development belong to that last category. Although the Quality-of-Life monitor as a boundary object does have functions in the network as a whole and in groups with CoP characteristics, the support for learning processes is mainly aimed at CoI type groups.

In relation to learning in the web-based learning platform Learn4SUN, three roles for the Quality-of-Life monitor as a boundary object are identified. Although these roles can be sequential, such a structured step-by-step participation in the network is not likely. Rather, these three roles could play a role in a different sequence or even simultaneously and repetitively throughout the period a stakeholder is active in the network. The first role is related to stimulating participation in the network. The constructivist type of learning envisioned in the network depends on social interaction. Such interaction can only take place after initiating participation and goes on for the duration that participation is sustained. The second role relates to progressing from CoP to CoI. People tend to interact within the social groups to which they belong. There is a psychological hurdle to pass when entering a group in which “others” are also a part. Progressing may require some level of guidance, for which a boundary object could play a role. The last role relates to the learning itself. Dialogue within a CoI is (in part) initiated and sustained by the boundary object. Presentation and choice of indicators can be important factors in the richness of learning processes taking place.

A key element for initiating and sustaining participation is projecting a feeling that participation matters. Feelings of ownership and empowerment are identified as being
important for that purpose. This means that potential participants are to have a say when it comes to selection of indicators, setting thresholds and interpretation of results. Sustained participation also requires the option to adapt existing indicators and to add new ones to allow the monitor to grow along with the progress of dialogue. A key feature of the monitor is thus a rather generic set-up that allows a flexible approach to monitoring. The consequence of this finding is that monitoring should be viewed in a rather innovative manner, moving away from traditional approaches. Monitoring should less be geared toward just fulfilling contractual obligations, not be centralized, not focus on a singular reality, not be set-up with only reliable data-output in mind, nor meant for tracking progress only.

To support progress from CoP to CoI, the monitor should be directly linked to the various Col type groups that are present in the network. This can be done by allowing each Col to adopt one or more indicators. The latest dialogue taking place in that group can be displayed beside or under the data on that indicator. A button to invite the viewer to participate in the dialogue by becoming a member of the group should also be displayed. This allows for a gradual passing of any psychological thresholds that may exist in “taking a step into the unknown”. A potential participant can view what is going on in a group until he/she feels comfortable to take the step of joining. Such a mechanism is needed to increase the probability of truly heterogeneous groups. People strongly identifying with a subject will feel less of a psychological barrier to join, which could lead to an accumulation of people with the same mind-set within a Col – this would essentially reduce a Col to a community with the characteristics of a CoP.

A key notion for the last role of the monitor (learning taking place within a CoI) is cognitive dissonance. Monitoring of indicators that result in documenting the obvious are not as likely to trigger rich dialogue (and thus learning) as indicators providing data that cause surprise. Although the selection of indicators is proposed as a participatory process, actors in the core of the network can propose indicators which are aimed at surprising outcomes. Such “surprises” can very well be imagined when measuring subjective quality-of-life. The inclusion of such indicators would require self-reporting as an instrument for measuring. Such a mechanism would not only play a role in the richness of dialogue, but would at the same time aid in initiating and sustaining participation. Since it deals with perception and opinion, it might very well at the same time trigger desire to express an opinion more clearly than by just checking a box in a poll. If that is the case, the inclusion of subjective indicators would also aid in progressing from CoP participation to active involvement in a CoI.

Discussion
Sustainable development issues are often referred to as messy problems. Such problems are to be dealt with by post-normal science with its extended peer community. In order to come to socially robust solutions – solutions that are supported by a broad segment of the population – integration of diverse perspectives and types of knowledge is required. The establishment of such support can be viewed as the outcome of a multi-actor learning process. In this study, a Quality-of-Life monitor is placed in the center of such learning by positioning it as a boundary object in the web-based learning platform Learn4SUN. A platform aimed at supporting learning for sustainable urban neighborhood development.

After integrating recent insights from a disciplinary highly diverse literature, it has become clear that stimulating participation of diverse groups in such a network over a prolonged period of time is likely to be the biggest challenge. One could imagine that people who are strongly socially or environmentally engaged are more likely to join a network on sustainable urban development than others who identify less with such issues. Such a mechanism would limit the amount of perspectives taken into consideration when looking for solutions and could thus make these solutions socially less robust. The intent must thus be to stimulate participation for as a diverse group of stakeholders as possible. The recommended features for the monitor are based on this premise. This is already reflected in the choice for a Quality-of-Life monitor. Quality-of-Life affects all, regardless of social, economic or...
environmental beliefs, but at the same time affects and is affected by each of those. The choice for quality-of-life is believed to aid in avoiding pre-selection of participants (stimulating participation of some groups more than others).

Another aspect to be taken into account with respect to pre-filtering (or pre-selection) of participants is to have mechanisms in place to avoid a dominance of socially mobile people. For some people, the psychological hurdle to move beyond the boundaries of the social groups to which they belong is bigger than for others. This is referred to as social mobility. The mechanism to avoid such filtering that is proposed in this study is the integration of communities of practice (CoP) as an (optional) intermediate step to progress to CoI participation. In the ideal case this would be tied with existing social structures in the neighborhood, such as religious congregations, schools, sports clubs and other. Key people in these communities could play a leading role in such CoP type groups (in the result section, such people are referred to as hubs). Interactive features of the monitor, such as participating in a poll on weight factors or scoring on subjective indicators that allow self-reporting, features to sort indicators or to compare different indicators can serve to support discussions in CoP type groups.

Within the network itself an open learning environment is envisioned. In order to promote sustained participation, the dialogue taking place must remain interesting and participants must have the feeling that their participation is important. In this respect, a reminder of a quote from Keulartz et al. (2004) is in place:

One of the most important features of the boundary object is that one group does not create or set the meaning of the object for other groups nor does one group regulate access to the object by other groups (Keulartz et al., 2004).

In an open learning environment, each voice should in principle have the same weight. Based on the premise that there are multiple legitimate perspectives on an issue, each group or individual should be allowed to develop equal feelings of ownership. Empowerment is not possible when one group claims ownership by defining the (boundary) object and set its meaning. As a consequence the boundary object should be both the subject and the outcome of dialogue. That is only possible if the proposed flexibility in design is respected. That in turn can raise tension between the monitoring objectives set for the SUN project and the requirements of a boundary object in relation to supporting learning processes.

If a Quality-of-Life monitor is intended to support learning in a web-based platform, the dialogue it supports becomes the primary consideration. Although initially a first set of indicators should be set by the designers of the network, any added indicators should be based on the outcome of dialogue in the various CoI type groups (or if desired also from CoP type groups). The same is true for changing indicators that do not seem to measure what groups are interested in and for the threshold to which the different indicators are measured. Such processes could very well reduce the value of indicators for the wish expressed in the SUN project to use indicators to compare progress in the different participating neighborhoods.

Similar tensions can be related to the very specific goals set in the SUN project. For the energy action for example this includes the exact number of houses that are to have improved isolation by the end of the project. For participants in a learning network such a given fact can suppress feelings of ownership and empowerment. Rather than being part of a group discussing a problem from different angles and taking different perspectives into account, their role is reduced to that of a willing assistant helping to solve a problem owned by another entity. It could be perceived that their perspective is less legitimate than that of those who have set the “best way” to reduce energy consumption in the neighborhood.

The key message to be taken from the previous two paragraphs is that combining monitoring with the notion of boundary objects and their role in learning requires an innovative view on
monitoring. A reminder of a quote from Guijt (2008) is in place. Her work is not related to boundary objects or urban sustainable development, but to rural resource management. Despite the difference in application, the quote combines monitoring and learning:

“Approach monitoring as an evolving practice, thus allowing it to become a dynamic knowledge production process, which when subjected to regular critical reviews and adaptations retains relevance and usefulness” (Guijt, 2008).

The accessibility and interactivity of the monitor are aimed to support learning, but the most important factor for the design on a Quality-of-Life monitor that is to be used as a boundary object to support learning is its flexibility. The flexibility allows an iterative process in which the monitor is both the trigger and the result of dialogue and in which a next version is the trigger of the next phase in the dialogue. The relevance of data can be improved if not only the measured neighbourhood is known to participants, but also the threshold (in the results section this was argued to be a non-neglected neighbourhood in the same city).

A last finding requiring some additional attention is the rapid change in internet use experienced today. The availability of mobile internet is growing fast and many applications (especially social internet) are increasingly geared toward this development. Although it is not possible to predict the future, it is safe to say that any learning platform designed today should keep mobile internet in mind. For the features of a Quality-of-Life monitor this includes adaptation to the small screens used in mobile internet as well as reducing the file size to respect the reduced bandwidth of these applications. For polling functions, entering data should be possible via the touch screens commonly used in mobile internet.

Final conclusions
This study has explored what recommended features of a Quality-of-Life monitor as boundary object in a multi-actor learning network would be and how these features can support the SUN project’s ultimate goal via cross-boundary learning processes between the actors involved.

A monitor should be publicly accessible to play a role in triggering participation in dialogue. The monitor should have a flexible design allowing to add or delete indicators or to alter indicators and/or their threshold. In order to sustain dialogue over an extended period of time, the monitor should be able to grow with that process. It should be both the trigger and the outcome of dialogue.

Stimulating participation in the web-based learning platform Learn4SUN is not the only element. At the same time the monitor should support learning processes. For this purpose the choice of indicators can play an essential role. Although not a design feature, the choice of indicators intended to seek surprise is a key factor in sustaining rich interaction and to increase the probability that various stakeholders representing different perspectives remain motivated and active.

Because of the growth in mobile internet, the monitor should be designed respecting the restrictions that apply to this type on internet use. That includes taking screen size, the use of touch screens and reduced bandwidth into account.
5. Recommendations

As a general recommendation for developing a QoL monitor, it is important to keep the “final product” in mind from the outset. Otherwise, choices made in the beginning of the project could become restrictive later on. In order to accommodate for needs later on in the project, the following features of a Quality-of-Life monitor to promote learning in the SUN multi-actor network can be recommended:

- Positioned to be accessible to all potential stakeholders with full functionality
- Comparing the target-neighborhood to a meaningful standard (example - non-neglected neighborhood in the same city)
- Equipped with a polling function to collect stakeholder data which is directly entered in the database – the tool should have some functionality to limit false reporting
- Stakeholder input includes indicators suitable for self-reporting, as well as the importance of individual other indicators (weight factors)
- Flexible with respect to adding or deleting of indicators
- Interactive in allowing sequencing and filtering of indicators
- Providing links to general social internet platforms and existing local communities
- Simple enough to be viewed on small screens (i.e. smart phones)
- Designed with mobile internet in mind

In this study, it has become clear that the concept of boundary objects and the role they can fulfill to bridge differences between groups of different origin has been extensively addressed in the scientific literature. However, much of the literature concerns reflection, debate, theoretical background as well as tentative design. Documentation of actual observations made on interaction and learning taking place around boundary objects is rarely found. Too few case studies are available. The use of boundary objects offers a promise to enrich dialogue and learning for wicked problems. The better the consequences of practical design decisions are studied and understood, the higher the chances that all aspects are taken into consideration that are relevant to provide a meaningful reference for all parties involved. Although reflection, debate, theoretical background and tentative design aid in achieving that goal, detailed case studies of boundary objects in use could improve understanding and prevent design mistakes in the future.

This study does not include the actual implementation of the Quality-of-Life monitor as a boundary object. Integrating the monitor in the learning network platform of the SUN project offers great potential to support the project’s objectives. As both the SUN project and the use of the related learning network platform (Learn4SUN) will continue for some time, a swift integration of the suggested boundary object in said learning network can provide an opportunity that has (apparently) been missing in many other projects. It provides a chance to observe and document both interaction and learning taking place around a boundary object. As such documentation is rare, it is recommended to make use of this opportunity.

The correlation of findings with respect to monitoring in the sectors of rural resource management and urban neighborhood development indicate that participatory monitoring could be useful as a boundary object in different domains. Further research could explore the extent to which the concept is useful in a wider range of applications.
References


SUN (2010). Comparative analysis of five evaluation frameworks. SUN Action 2 working paper (draft version 16/05/10).


Appendix A


The Sustainable Urban Neighborhood
We (the authors of this paper) attempted to merge the various insights and ideas resulting from the association rounds and the general discussion into a common working definition of a sustainable urban neighborhood (SUN). We decided to give the definition the form of a list of desired attributes in order to be able to reflect all the nuances that were expressed by the SUN project team. The following 10 characteristics of a SUN stand out:

1. First of all, a SUN is a **dynamic system** of ‘stocks and flows’: of people, goods, services and physical features such as the built environment, green spaces and infrastructure.

2. A SUN offers a living environment where inhabitants feel good and do not want to leave. They feel inspired and engaged to participate in the developments going on in their neighborhood because they care for their own living place and for their well-being and that of others. They experience a good **quality of life** on the health level, on the social level, on the level of economic participation and on the level of the ecological space.

3. A SUN is **economically vibrant**. It develops its local economy by creating job opportunities, by stimulating entrepreneurship, and by inspiring creativity and dynamism. At the same time a SUN enhances its social resources by stimulating learning and personal development and by increasing tolerance and understanding between people and groups with various norms and values.

4. A SUN connects its **past** with its **present** developments and its **future** ambitions. It respects and enhances the cultural and architectural heritage of the past and regards its longer story as inspiration for present decisions and activities.

5. In a SUN inhabitants, visitors and other participants consider and treat each other with tolerance and respect. All human participants of the neighborhood feel that they together form a **cohesive community**. This community is composed of diverse cultural backgrounds, ages, personal situations, and income levels.

6. A SUN is **positively integrated within the wider environment**, playing a positive role at the city level as well as on the higher level of the region. It is aware of the influence it has on these urban levels and it takes into account the influence it has on the ecological system that is a constituent and life giving part of this broader matrix.

7. In a SUN, the **accessibility** to and from the neighborhood is well developed by means of a well-functioning, safe, accessible and attractive infrastructure. Roads, cycle roads, pedestrian pathways and public transport should open up the neighborhood to people, goods and services. There is a constant and lively flow of interaction, both within the neighborhood itself, as well as between the neighborhood and the areas surrounding it. The surrounding area includes neighbor-neighborhoods, green spaces nearby, the city center (the cultural- and the commercial center), the rural and natural areas surrounding the city, and other cities in the region.

8. A SUN cherishes and develops its **environmental quality**. Where possible and necessary, a SUN consciously reduces its negative environmental effects (including those of economic activities) and progressively improves its ecological quality, air quality, reduces noise pollution, cares for biological diversity within the green spaces, improves waste- and water management inter alias by participative maintenance. In a sustainable urban neighborhood, innovative and practical ideas to maintain or improve the environmental quality are stimulated, appreciated and will be facilitated by the authorities and the community.

9. In a SUN, citizens are engaged in the **maintenance and care of the built environment**. Regeneration of housing and buildings, especially improvement of their...
energy performances, occurs spontaneously, facilitated and if necessary initiated by public authorities. The basis for a SUN is a certain level of self-organization, occurring naturally, within the context of the broader city policy.

10. A SUN provides **low-threshold access to facilities** (inside or outside of the neighborhood) that stimulate personal development for all generations: safe playgrounds, schools, centers for creative education, music courses and facilities for band or orchestra rehearsals, exhibition facilities for professional and amateur artists, and sports facilities.

In addition, three key management principles emerge:

1. In a SUN, an ideal combination exists of on the one hand **top down** approaches of urban planning and environmental management, and on the other hand **bottom-up**, or grassroots, initiatives for the development of the neighborhood. Inhabitants are inspired and facilitated to participate in the development of their own neighborhoods. Planning- and policymaking processes include the knowledge and experience of local inhabitants.

2. The management and development of a SUN should be **integrative**, considering the social, economic and environmental needs and their interconnections. The pooling of knowledge, creativity and financial resources improves the effective use of funds and investments.

3. Ad-hoc policy and incrementalism is avoided. The development of the neighborhood is designed according to a **clearly pronounced vision**. At the same time a fixed way of planning should be avoided as well. This can be achieved by taking on an approach that is reflexive, adaptive and flexible and that takes uncertainties and surprises into account (Loorbach, 2002).
Appendix B

Interview with Daniel Haug, WorldService Information Solutions on 04/01/2011

This interview is done to appreciate the technical possibilities as well as limitations for creating a Quality-of-Life monitor as an interactive and dynamic boundary object in the internet.

JO – Are there up front any technical limitations in the internet I should be aware of?
DH – In principle everything is possible in the internet, but the work involved and with that the cost can vary substantially depending on choices made.

JO – [Describes a possible QoL monitor as described in the chapter “schematic representation” in this report (at the state as it was on January 4, 2011) to give DH an impression of desires.]
DH – What are your first thoughts?
JO – Could different time series be compared?
DH – Yes, you could compare 2 or more time series, but the complexity and cost of the system would rise if you provide the option of comparing $n$ different data sets – 2 or 4 pose less a challenge. You could for example show different sets in the same graph with different colors, or place two graphs next to each other.

JO – How about the data being up-to-date?
DH – In the internet, the data are entered in a database and when somebody is visiting the site and calling a graph, the graph is created at that moment – it thus takes all entries into account which makes it “very” up-to-date.

JO – How could weight-factors be displayed?
DH – You could work with the width of a bar – if you would have a minimum and maximum number of pixels – for example ranging from 10 to 30, an average from responses could be assigned any value in between these limits, which would identify the width of the bar – that same number could by the way be used in calculating an overall score that respects the weight-factors. I should mention that a display in horizontal bars gives fewer complexities in development. The more complex a graph, the bigger the risk that you need to take Flash into consideration – that in turn would pose display problems on hardware such as the iPad.

JO – If both the control value and the current value are variable, does this pose any problems in display?
DH – In that case you would need to assign a multiplier that sets all control scores for the same value – for example 100%. You would then compare the current score with the control score using the same multiplier, which sets the length of the bar.

JO – What should be taken into consideration for entering data?
DH – That depends – objective data are probably entered by the “inner circle” you described and could take place after a simple log-in procedure. For the interactive poll in the internet, you need to give it some thorough thought. You would need an identifier to place the person on a location that is valid for your statistics. In the Netherlands, the ZIP code would work, as it works on street level. This is not the case in other countries.
A good option that works everywhere is integrating Google maps, but since neighborhoods are not squares, the geo-identification could prove challenging. I guess your biggest problem is keeping some level of control over who enters data. This would require including some sort of identifier for the individual. Email addresses work good for that purpose as it is a unique identifier and most people have no more than 1 or a few different addresses. You could also connect the option to respond to a questionnaire with being a member in the learning network. This in turn brings considerations for data security – an option is to delete all data with the exception of the email address and the scores.

JO – Can you think of any other control mechanisms that would not have too much of a negative impact on motivation for participation?

DH – An option is the have a mediate agent – somebody asking questions and entering the data for the subject. Another option would be integrating your marketing efforts with data-collection. If each brochure holds a unique number – a number to be entered in order to participate – each number can only be used once and the chance of multiple answers from the same person is restricted. In that case you could place an option to request such a number on the page – that would justify asking unique data and thus placing the person in the right geographical location, while preventing too many responses from the same person.

JO – The SUN project is multi-lingual – does that pose any problems in the internet?

DH – No – but you have to make choices. If you are sure that the future will not require any new languages, other than the current English, German, French and Dutch, it is probably best to have a unique set of static pages in each language. The dynamic elements (data) are then imported coming from the same source. If you want optimum flexibility for future expansion, it is better to make the text dynamic (integrate it in a database) and generate the pages in the correct language the moment a visitor with an internet browser in that language visits the page.

JO – Thank you for your time and the helpful answers!
Appendix C

Learning & Education

“Learning is defined as a persisting change in performance or performance potential that results from experience and interaction with the world” (Driscoll, 2005). A learning theory is a set of constructs that links the interaction and experience with those changes in performance (Driscoll, 2005). Theories of cognition attempt to capture the essential representations and mechanisms that underlie cognition, but:

“The mystery of the human brain is one of the few remaining frontiers of science” (Taatgen & Anderson, 2009).

Each learning theory proposes its own hypothesized structures and processes that explain how learning takes place. Driscoll (2005) refers to this as assumptions about learning.

Learning leads to an increase in knowledge and understanding (or skills). Regarding knowledge, there are three major epistemological traditions – objectivism, pragmatism and interpretivism. They differ in their assumptions about reality and the source of knowledge. Objectivists view reality to be objective – true knowledge of the world is possible and experience (not reason) is the source of all knowledge. Interpretivists hold contrasting views – to them knowledge comes from reason, while reality is constructed and multiple. There is not one truth, because everybody has (and is entitled to) his own interpretations. Pragmatism takes sort of an intermediate position (Driscoll, 2004).

Taking the step from learning to education, educational theory tries to predict actions (such as teaching or participating in a dialogue) that lead to (effective) learning. Cognitive Information Processing (CIP) and behaviorism emerged from the objectivist tradition (Driscoll, 2005). Although CIP emphasizes the importance of cognitive processes, the theory assumes that knowledge exists outside of the learner. Objectivism is the view that an individual’s experience of the world results in knowledge of the world. An improved approximation of (existing) truth thus comes from ever broader and deeper sensory input. In contrast, situated cognition is a constructivist approach which follows the knowledge tradition of interpretivism. In this tradition, knowledge is seen as a construct of the mind - an idea about reality, rather than reality itself. (Driscoll, 2005). Knowledge is constructed from lived practices of people in a society setting.

Constructivism views learning as a social process. Learning (the construction of knowledge) takes place in the mind. Every individual has certain knowledge constructs – schemas. These differ from person to person. Where learning in school is often CIP based, learning in day-to-day life and at work is more conveniently related to constructivism. In that case learning takes place where knowledge is going to be used later. This is called situated cognition (one variation of constructivism). Elsbach, Barr and Hargadon (2005) propose a framework to identify situated cognition in organizations in which they place the cognitive process of sense making in between sources and results. The sources are existing schemas and the organizational context, while the result is the momentary situated cognition. The momentary cognition however immediately becomes an existing schema and makes place for a next momentary cognition. They thus view cognitions as temporary or transitional constructs. An environment rich in momentary cognitions should enrich individual knowledge constructs. The constructivist view implies that (social) interaction leads to learning and that increasing the number and duration of contact moments between different people, situations and other would increase the number of learning opportunities. A network based on the constructivist tradition would thus try to bring people in contact and animate dialogue between them to support learning processes.