The Diamond of Alignment

A "Process" Guide to Understand and Inform the Practice of Building Sociotechnical Constituencies and Innovation

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This guide is structured following the various dimensions of the diamond of alignment, a conceptual instrument that reflects the process of sociotechnical alignment essential to all processes of building sociotechnical constituencies and innovation. It is an instrument to capture process evolution and can be used recurrently in the course of an innovation process to assess the strengths and weaknesses (i.e., quality) of its alignments and, thus, the effectiveness of the strategies pursued until then. The guide can also be used to research and map the history of the alignment processes since their birth.

In the diamond of alignment *the process* is represented by the constant interactions among all its dimensions, with dimensions (I) and (II) representing the actual "sociotechnical content" of the emerging constituency at a given point in time. And the other four dimensions representing critical factors the constituency must try to keep in alignment to enhance the chances of success of the innovation process. It must be taken into account that the borders between all the dimensions are not absolute and sometimes elements of one can be found in another. The "nature of the target problem" is a case in point, since it is closely related to dimensions (I) and (II), insofar as it is "constituents' perceptions, goals, actions and resources" that influence its definition and, indeed, whether the process is actually "technology-driven"[1] or "problem or opportunity-driven".[2] At the same time, the "nature and maturity of the technology" also conditions the "nature of the target problem" -as well as dimension (I)- since it "gives" the characteristics of the "technical terrain" whereupon the constituency-building process unfolds.

Whether a constituency-building process is "technology-driven," or "problem and/or opportunity-driven" is very important for understanding and making effective use of this guide in ICT-based educational processes.

If the case is "technology-driven" then Dimensions (I) and (II) will tend to precede and help define the "nature of the target problem." This case is more likely to happen with very emerging technologies that are creating completely new types of users and practices rather than merely improving on some existing process or systems.

If the case is "problem or opportunity-driven" then Dimensions (I) and (3) will tend to precede and help define the "nature and maturity of the technology." This case is more likely to happen when the constituency's leaders are completely focused on the solution of a problem and will use any technology that will ensure progress in the desired direction.

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[1] The constituency building is fundamentally dominated by *the pursuit of success for the technology* in the belief that it will indeed satisfy an explicit or latent demand.

[2] The constituency building is fundamentally dominated by the identification of a problem and/or opportunity that can be tackled by an existing or new technology

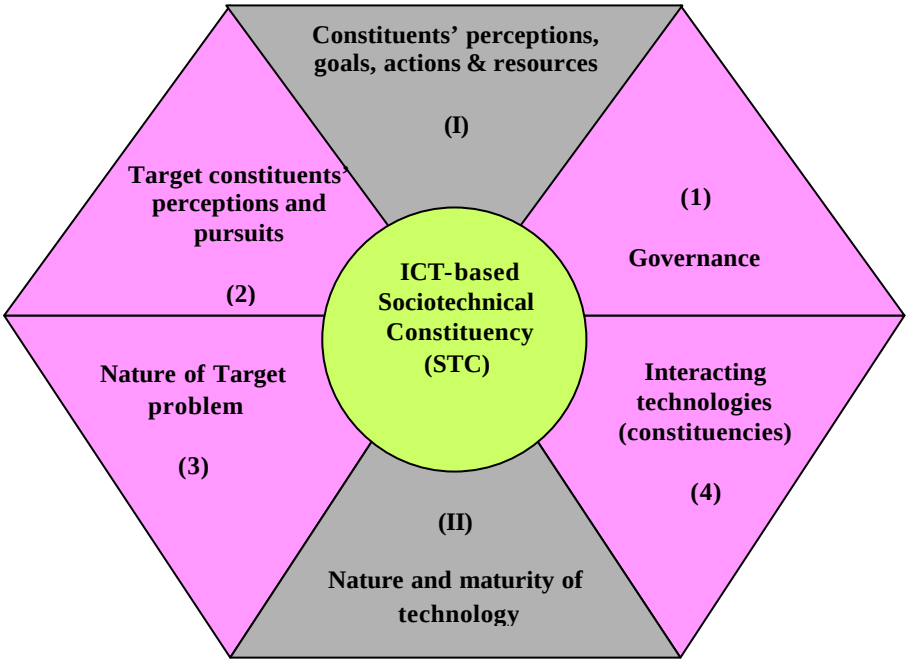


Figure 1. Dimensions in the Basic Diamond of Alignment

In practice, the use of the guide will always require flexibility and insight from the User since a lot of constituency-building processes are probably a mix of "technology-driven" and "problem or opportunity-driven" depending on the state of their evolution. Most importantly, however, apart from the point of what comes first Dimension (II) or Dimension (3), the User needs only know that, ultimately, both processes -"technology-driven" and "problem or opportunity-driven"- are fundamentally the same in that their success equally implies the need for building sociotechnical constituencies through processes of sociotechnical alignment.

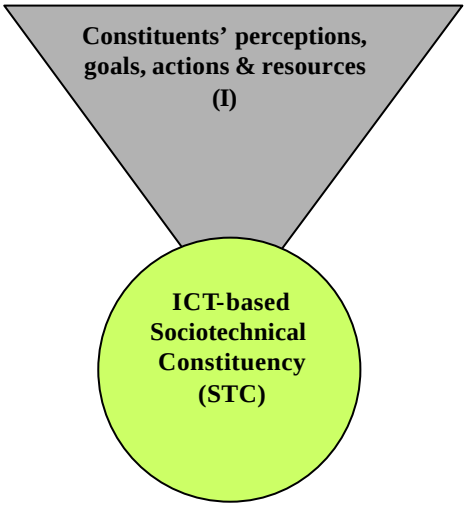
Below this guide assumes that most of the ICT-based innovations to be studied are "problem or opportunity-driven," and this is reflected in the order of sequence of the sections dealing with Dimension (II) ("nature and maturity of technology") and Dimension (3) ("nature of target problem"). Dimension (3) is dealt with first within the major Section Getting to Know the Emerging ICT-based Constituency.

GETTING TO KNOW THE EMERGING ICT-BASED CONSTITUENCY

In the following, the "process" guide first provides a range of questions that will enable innovators or "constituency-builders" gather systematic knowledge of the characteristics of their emerging constituency. The following three dimensions are involved:
Dimension (I) – Constituents' Perceptions, Goals, Actions and Resources
Dimension (3) – Nature of the Target Problem
Dimension (II) – The Nature and Maturity of the Technology

Constituents' Perceptions, Goals, Actions and Resources (I)

This dimension relates to the present state of the constituency's resources: the type of organisation, people, material and financial resources, knowledge, experience and reputation. It also includes other elements such as current perceptions, goals, visions and strategies.



People's visions, goals, strategies and organization

- When did it start?
- Who is starting the constituency-building?
  - The headmaster?
  - Teacher/s?
  - Student/s?
  - Other/s?
- What are the main reasons behind it? What perceptions have been most influential in prompting the constituency-building process?
- Is there an initial vision for the process? If so, what is it?
- Are there defined goals for the process? If so, what are they?
- Is there a defined strategy the constituency is pursuing? If so, what is it?
- Is the process following the steps or example of some other school or organizations?
- How many people are involved?

- What are their roles in the school?

- Is there some form of formal and/or informal organization for the constituency?
- If so, what is the shape and explicit and/or implicit rules of this organization?
- How does decision-making take place? Is there some formal mechanism?
- Is decision-making fundamentally based on trust and authority of leaders?
- Does the organization operate from within existing school's structures?
- How does this operation advance the growth of the constituency?
- If there is no organization, will there be one emerging in the future? Why?

People's expertise, reputation, commitment

- What is the ICT knowledge, expertise of the people in the emerging constituency?
- How many members of the emerging constituency are trained in ICTs?
  - What is the level of expertise?
  - Basic computing and software (e.g., Office)
  - Higher sophistication (e.g., multimedia packages, Photoshop, educational CDs)?
  - Do they have any knowledge of free and open source software?
- How many members of the emerging constituency are trained in new educational and didactical practices?
  - What is their level of expertise?
  - Are they experienced in collaborative working with students or other teachers?
  - How many have transformed their courses using new methods and ICTs?
  - How many have helped other teachers or other personnel in the use new methods and ICTs?
- How many members of the emerging constituency are trained in innovation processes?
- How many members can be said to be leaders or innovators?
- Is there strong support by authorities to the ICT-based innovation process?
- Please assess the motivation, determination and commitment of the leaders of the emerging constituency?
- Do leaders and member of the constituency have intangible resources such as good reputation, good will and esteem?

Financial resources

- What are the annual *financial* resources available to the emerging constituency?
  - How much can be spent in ICT equipment?
  - How much can be spent in software?
  - How much can be spent in training?
- Can the financial resources be increased through means other than budget allocations? How? (e.g., Collections? Parent's donations? Other)
- Are people in the school rewarded financially by taking extra work to advance ICTs and didactical skills in the school?

Time resource

- What are the *time* resources available to the emerging constituency?
- How much curricular time in a week can leaders of the constituency devote to it?
- Are people in the school rewarded (e.g., freeing time from other activities) for working on the ICT-based constituency, transforming a course, o helping a colleague, etc.? How?
- Are they rewarded by any extra-curricular time spent on improving ICT or new pedagogical skills? How?

Space Resource

- What are the *space* resources available to the emerging constituency?
- Where in the school can be said that ICT-based education takes place?
  - Classroom
  - Laboratory
  - Library
  - Communal spaces (i.e., rooms, corridors)
  - Outside school (i.e., homework)

Digital resources

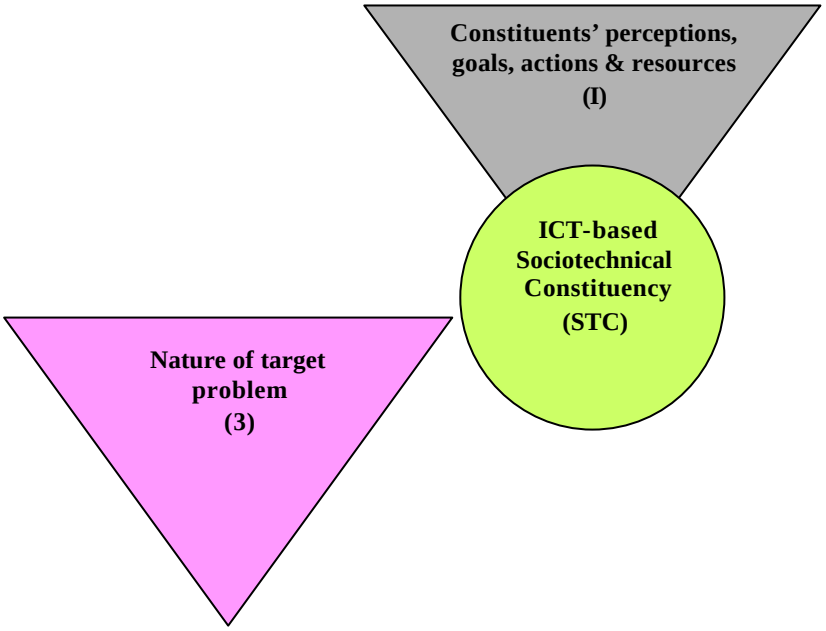
- What are the *digital equipment* resources available to the constituency?
  - How many computers? and What is the average age?
  - How many laptops? and average age?
  - How many printers and scanners? and average age?
  - How many TVs and video recorders? and average age?
  - How many digital cameras?
  - How many computer projectors?
  - How many digital whiteboards and digital benches?
  - How much of this equipment is networked?

- What are the *software* resources available to the emerging constituency?
  - MS Office (Word, Excel, Powerpoint, Access)
  - MS Project
  - Acrobat
  - Photoshop
  - Oracle database
  - Subject software
  - Pedagogical software
  - Other
- Are there software packages the ICT-based constituency would wish to use but cannot access? Why?

- What are the *networking* resources available to the emerging constituency?
  - Broadband? How many Mbits/second
  - ADSL
  - ISDN
  - POTS
  - Local Area Network
  - Intranet
  - Internet
- Is access to the network free? Or does it entail a cost?
- Is access to the network limited in time?
- Is access to the network restricted to some people?

Nature of the Target Problem (3)

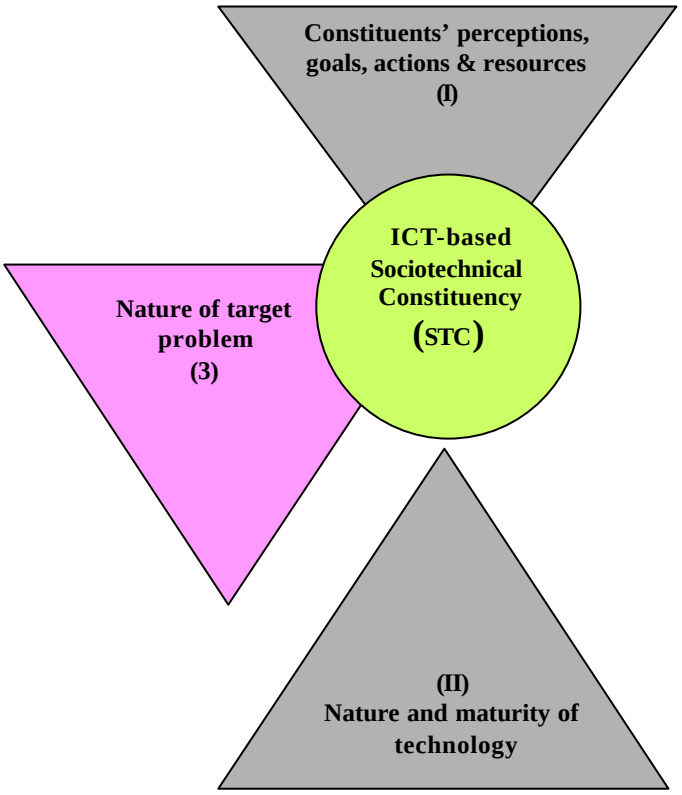
This dimension highlights the importance of alignment between the capabilities of the emergent constituency and the requirements of successfully delivering the results implied in the nature of the target problem, including the implementation of new technologies and associated practices.



- What educational problem/s or opportunity is the constituency-building process for the ICT-based innovation trying to tackle? (e.g., low attainment, low motivation, student truency, etc.)
- What classroom problem/s or opportunity is the constituency-building process of the ICT-based innovation trying to tackle?
- What school problem/s or opportunity is the constituency-building process of the ICT-based innovation trying to tackle?
- Are the objectives of the ICT-based innovation process well defined? What are these objectives?
- What specific benefits are envisaged or promised from an educational point of view?
- What specific benefits are envisaged or promised from a school point of view?
- What specific benefits are envisaged or promised from an external point of view (i.e., parents, other schools, educational system)?
- Does the ICT-based innovation require substantial re-engineering of existing activities?
- Does it require significant change in skills and re-training of users (teachers, students, etc.)?
- Is this anticipated in the design and strategy of the constituency-building process? In what ways?
- What are the initial estimated cost and time of development and implementation of the ICT-based innovation?
- Are the available technical capabilities and human and financial resources of the project well matched to the envisaged objectives? If not, why?

Nature and Maturity of the Technology (II)

This dimension relates to the "nature and maturity of the technology" the constituency is wishing to create or implement in its innovation process. Different technologies imply different strategic opportunities and constraints and innovators must take account of this in their strategies. The creation and implementation of an emerging technology such as a "networked e-learning system" should not be treated the same as the implementation of a more mature technology such as a computer.



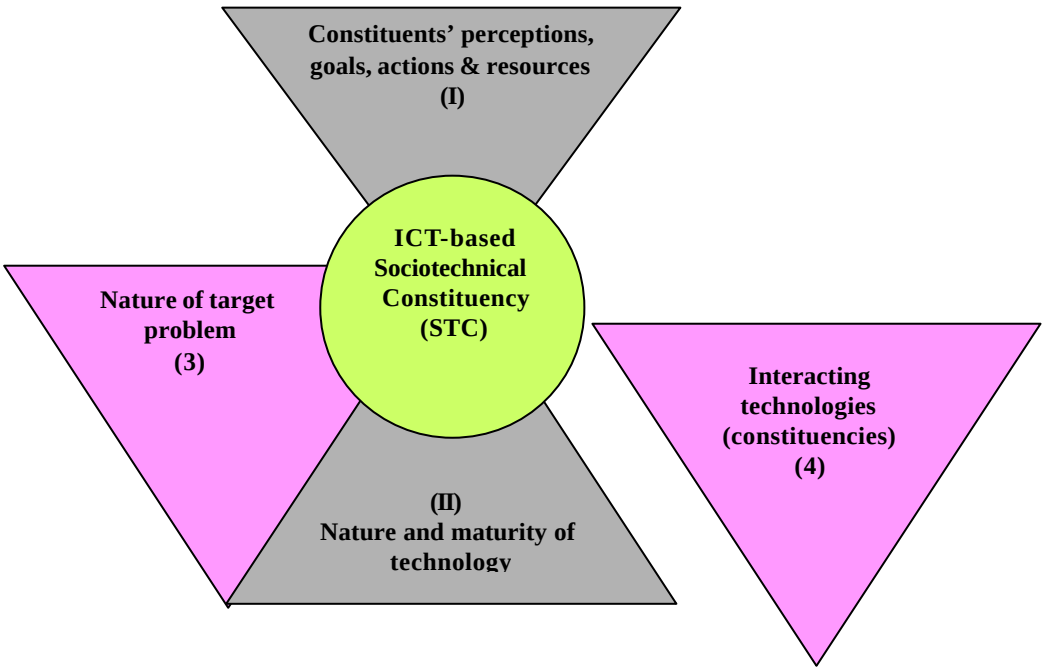
- Is the constituency trying to create, test and pilot new educational technology?
- If so, what are the characteristics and performance specifications of this new technology?
- Does the constituency seek to use standard mature technology?
- What is the technology mix in terms of hardware, software and networking?
- What are the characteristics and performance specifications of the technology required by the constituency for its ICT-based innovation?
- Do they imply major cost/performance improvements in relation to previous systems? Or do they enable the provision of a completely new service?
- How innovative or technically demanding is the system? What are the risks of failing to deliver in terms of anticipated performance, cost and time?
- Does the adoption of the system by users require learning new technical skills such as software languages? If so, what is been done to ensure that this will happen? Or,
- Is most of technology transparent to the user and the interface user friendly? If yes, how do you know? Has there been usability testing and piloting?

GETTING TO KNOW THE ENVIRONMENT, PEOPLE/ORGANIZATIONS AND OTHER TECHNOLOGIES INTERACTING WITH THE ICT-BASED CONSTITUENCY

In the following, the "process" guide provides a range of questions that will enable innovators or "constituency-builders" gather systematic knowledge of the characteristics of the environment, people/organizations and other technologies the ICT-based constituency must interact (align) with in order to realize the build up of the constituency. The following three dimensions are involved:
Dimension (4) – Interacting Technologies (Constituencies)
Dimension (1) – Governance
Dimension (2) – Target Constituents' Perceptions and Pursuits

Interacting technologies (4)

This dimension relates to the interaction a constituency's technology has with other existing or emerging technologies. No constituency emerges in a vacuum. There might be first the legacy systems in place. There might also be other new technologies and innovations either competing or collaborating with the constituency's technology.

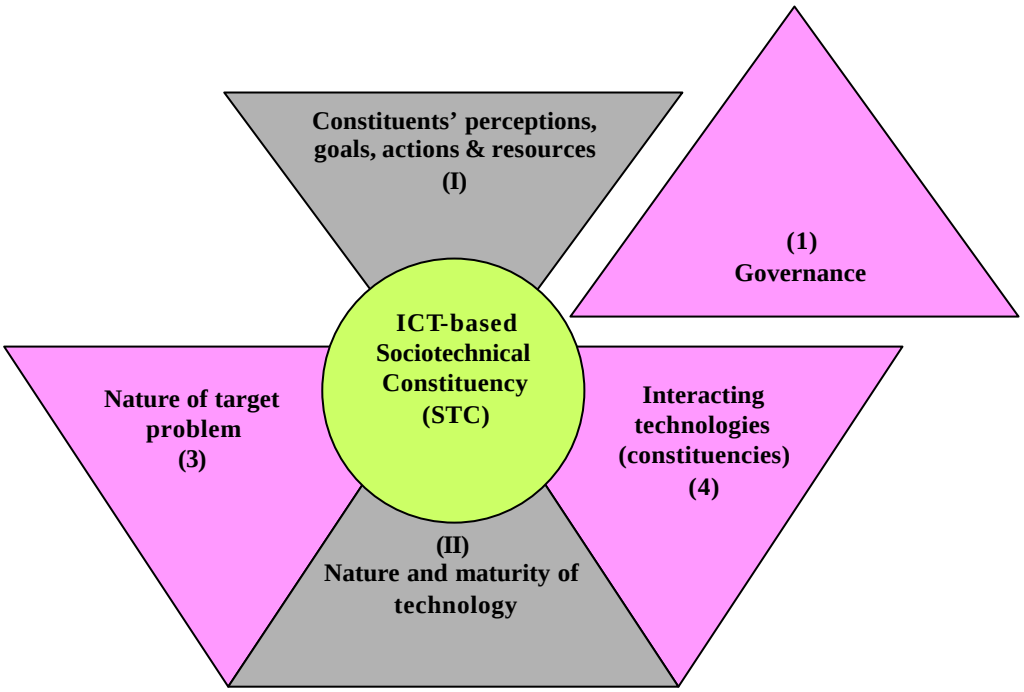


- What is the relation or interaction between the technological system of the ICT-based innovation and existing technological systems?
- How does the ICT-based system relate to educational legacy systems previously in place? Is it simply displacing them? If yes, is this happening fast or in a gradual evolutionary way?

- Is the new system blending with the legacy system? Does this imply sacrificing performance?
- In both cases, what are the implications for skills and training?
- How does the ICT-based educational system relate to other new systems that may be in process of development and implementation?
- What are the implications for adoption? Will the final system be a mix? And will this be the 'best' technical solution?

Governance (1)

Constituency-building processes commonly emerge in organizational, market and geographical environments that have having distinguishable 'rules of the game' or governances associated with established practices, power relations, routines, cultures, etc. At the two extremes, constituencies must either seek to align with the governance of their organisational and educational environments, or, seek to re-align this governance to favour the growth of its own purposes.



- Has the school a highly centralized management? Or a culture of participation in decision-making?
- How is the motivation of teaching personnel at school? Are they proud of their school?
- How is the motivation and discipline of students in the school?
- Are students happy to come to school? Are they proud of their school?
- Do teachers consider themselves well remunerated?
- Do teachers consider themselves overloaded with work?
- Do teachers consider their school facilities to be among the best? Why?

- Has the school a culture of innovativeness?
  - Is the school an early-adopter of new didactics methods?
  - Is the school an early-adopter of ICT-based educational methods?
  - Does the school celebrate any day or activity aimed at encouraging innovation?
- Are teachers and other school personnel encouraged to innovate?
- Are pioneering teachers rewarded for their efforts? How?
  - Are they giving financial bonuses?
  - Are they giving appropriate time?

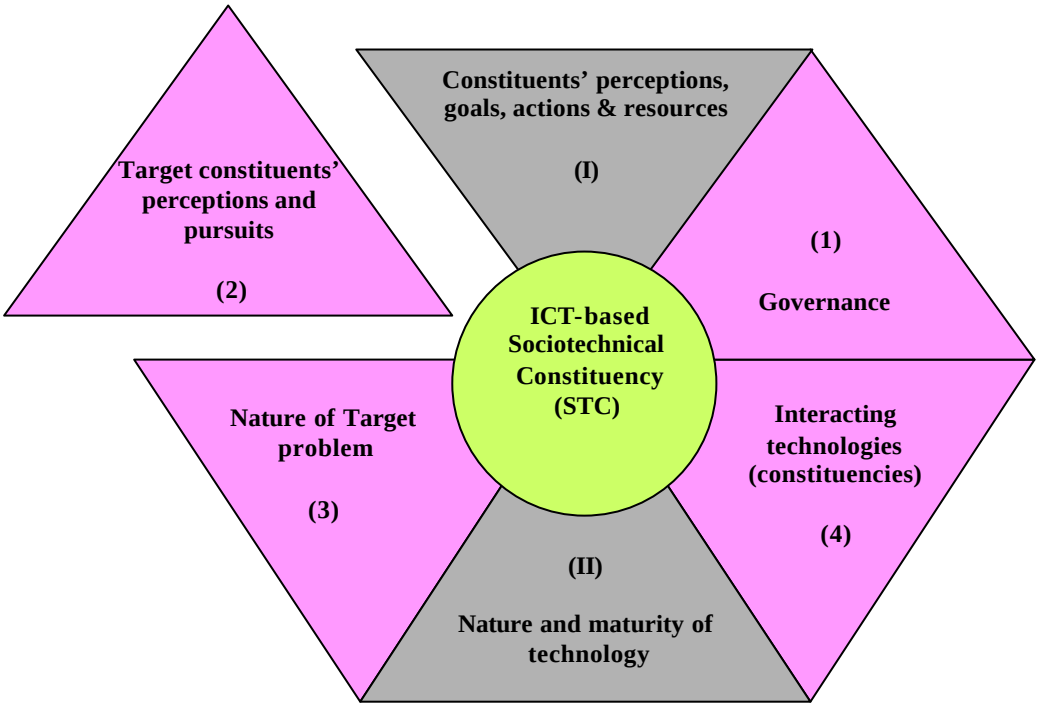
Are they giving high-profile recognition?
Other?

- Are didactical methods in the classroom highly traditional with teachers in command as transferors of knowledge?
- Do didactical methods encourage a new learning relationship between teacher and students? What is this new type of learning relation?
- Does the school encourage participation and inclusion in learning, with students also playing the role of "teachers" in specific activities? What are these activities?
- Does learning takes place mostly presentially at the classroom or are there new combinations of times giving students higher responsibility? How?

- Does the school encourage learning relations with other schools? Where?
  In the area (region)?
  In the country?
  International?
- Does the school encourage learning relations with other educational institutions such as universities?
- Does the school encourage learning relations with the private sector?
- Does the school encourage learning relations with NGOs?
- Does the school encourage learning relations with community organizations?
- Please describe the type of learning relations the school has with other schools?
- Please describe the type of learning relations the school has with other educational institutions?
- Please describe the type of learning relations the school has with the private sector?
- Please describe the type of learning relation the school has with NGOs?
- Please describe the type of learning relation the school has with community organizations?

Target Constituents' Perceptions and Pursuits (2)

This dimension relates to the people and organisations (and their resources) the constituency is seeking to enrol to enhance its process of growth. It implies an alignment of perceptions and pursuits between the members of the innovating constituency and target constituents such as other teachers, students, senior personnel, etc.



- Has the constituency-building process gained full or partial acceptance and support inside the school?
- Has the number of people/departments in the school adopting ICT-based innovation grown rapidly and substantially?
  - If yes, what are the main factors for this success?
  - If not, what are the main factors for this lack of acceptance?
- Has the STC process got the necessary support from the school's top authorities?
- What is the reputation of the ICT-based process among different school's departments (subjects)?
- Has the process got the necessary resources in terms of people, expertise, funding and facilities?

- If not, what constituents are still missing?
  - School's top authorities who support ICT-based innovation?
  - ICT-trained administrative personnel?
  - ICT-trained teachers?
  - Didactically-trained teachers
  - Technical personnel?
  - ICT-trained students?
  - Supportive educational authorities (external support)?
  - Digital equipment (computers, laptops, networking, etc.)?
  - Good facilities such as computer networked classrooms?
  - Good e-learning platforms for collaborative work and learning?
  - High-quality educational software?
  - Highly-relevant catalogued website information per subject?
  - Tutoring and support on the use of multimedia for course transformation?
  - Other?

- How have the constituency's promoters ('champion/s') gone about building support for the ICT-based constituency?
- What strategy and tactics are they using to enrol target constituents?
- Have they tried to involve target constituents in a selective fashion?
  - What have been the priorities?
  - What have been the main difficulties?
- Have "priority" target constituents been approached very early on to contribute to the definition of the ICT-based innovation?
- Has the project implemented promotional or demonstration activities? What specifically? Have these activities proved effective? How?
- Is the number of target constituents who have not yet supported the project high?
- Do you know whether their perception of the ICT-based innovation is mildly favourable, indifferently neutral or outright negative?
- Is the ICT-based innovation truly aligned or mis-aligned with their interests or activities (e.g., career progression?)
- Are the constituency's leaders taking differentiated action to enrol these target constituents into the project?
- What actions are being taken to enrol those target constituents who are mildly favourable but are not yet supportive members of the constituency?
- What actions are active constituents taking to enrol those target constituents who are indifferently neutral at present?
- What happens if the constituency-building process does not succeed in transforming these target constituents into supportive members of the constituency?
- Is the entire ICT-based innovation under threat? Will it have to wait for better times?
- What can be done to un-block the situation?

- In the case of outright negative attitudes, is this significant as to threatening the growth of the constituency?

- Does the opposition come from another process of constituency-building with similar aims to the ICT-based innovation but driven by different people and competing for the resources of the school?
- Or, does it come from people wanting to maintain the *"status quo constituency"* represented by traditional educational practices, techniques and systems? Is this opposition well organised or entrenched at the top level of senior authorities of the school?
- How is the project tackling the opposition? Is it possible to find ways to collaborate or the relation is one of frontal conflict?
- Can opposition to the ICT-based innovation process eventually lead to its cancellation or failure?

Historical and/or Evolutionary Use of the "Process" Guide

At the beginning it was said: "this guide is an instrument to capture process evolution and can be used recurrently in the course of an innovation process to assess the strengths and weaknesses (i.e., quality) of its alignments and, thus, the effectiveness of the strategies pursued until then. The guide can also be used to research the history of the alignment processes since their birth."

Of course, as the process of constituency-building advances this will be reflected in the need to adapt and modify the questions presented in this guide. Thus. some questions will become part of the history of the project, for instance:

- Who is starting the constituency-building?
- What are the main reasons behind it? What perceptions have been most influential in prompting the constituency-building process?
- Is there an initial vision for the process? If so, what is it?
- Are there defined goals for the process? If so, what are they?
- Is there a defined strategy the constituency is pursuing? If so, what is it?
- Is the process following the steps or example of some other school or organizations?

At the same time, there will be new questions reflecting the assessment of progress of the constituency-building process, for instance:

- Is the original vision or objective on course or has it changed in time? If so, how?
- What are the present achievements? Do they match expectations?
- Are the technical aspects of the ICT-based innovation completed?
- Is the ICT-based innovation implemented across the organization?
- Has the process hit major problems, what are they

Once an assessment is conducted, the format of Table 1 can be used to summarize the key aspects and issues characterizing the state of each one of the dimensions of the diamond of alignment. The overall result should then provide a clear overview of the strengths and weaknesses of the different alignments implied in the process of constituency building. Such overview should in turn be useful to assess or re-assess the quality of the strategies in operation in a given process of constituency building.

Thus, if the dimensions of the diamond of alignment show a fundamentally harmonious relation to each other, then we can legitimately conclude that the constituency-building strategy being implemented has been highly effective an sound.

On the other hand, if the dimensions of the diamond of alignment show a fundamentally dis-harmonious relation to each other, then we can legitimately conclude that the constituency-building strategy being implemented is either wrong or, simply impossible in the circumstances. This may lead either to the revision of the strategy to try to induce new re-alignments or, simply, to the whole revision and potential abandonment of the constituency-building process.

Table 1. Dimensions of the Diamond of Alignment
Constituents' Perceptions, Goals, Actions and Resources (I)
This dimension relates to the present state of the constituency's resources: the type of organisation, people, material and financial resources, knowledge, experience and reputation. It also includes other elements such as current perceptions, goals, visions and strategies.
Nature and Maturity of the Technology (II)
This dimension relates to the "nature and maturity of the technology" the constituency is wishing to create or implement in its innovation process. Different technologies imply different strategic opportunities and constraints and innovators must take account of this in their strategies. The creation and implementation of an emerging technology such as a "networked e-learning system" should not be treated the same as the implementation of a more mature technology such as a computer.
***Governance* (1)**
Constituency-building processes commonly emerge in organizational, market and geographical environments that have having distinguishable 'rules of the game' or governances associated with established practices, power relations, routines, cultures, etc. At the two extremes, constituencies must either seek to align with the governance of their organisational and educational environments, or, seek to re-align this governance to favour the growth of its own purposes.
Target Constituents' Perceptions and Pursuits (2)
This dimension relates to the people and organisations (and their resources) the constituency is seeking to enrol to enhance its process of growth. It implies an alignment of perceptions and pursuits between the members of the innovating constituency and target constituents such as other teachers, students, senior personnel, etc.
Nature of the Target Problem (3)
This dimension highlights the importance of alignment between the capabilities of the emergent constituency and the requirements of successfully delivering the results implied in the nature of the target problem, including the implementation of new technologies and associated practices.
Interacting technologies (4)
This dimension relates to the interaction a constituency's technology has with other existing or emerging technologies. No constituency emerges in a vacuum. There might be first the legacy systems in place. There might also be other new technologies and innovations either competing or collaborating with the constituency's technology.

Graphical View of Alignment Assessment

Following an assessment, the alignments and/or mis-alignments in Table 1 can be given a graphical expression by using the diagram of the diamond of alignment as a spider web. See examples in:

- Molina, A., *Breaking Down Barriers and Walls: The Evolution of ICT-Based Educational Innovation in a Primary School Context*, Management School, The University of Edinburgh, Edinburgh, 2004.
- Molina, A., *E-Learning Innovation in Stockholm's Secondary Schools: Advances and Set-Backs in "Collaborative-Personalization" in Education*, Management School, The University of Edinburgh, Edinburgh, 2004.