



Specifications for Case Study Designing

Considerations

The case study is a detailed analysis of a person or a group, especially as a model of a psychological or social phenomenon.

From the management point of view, the case study is a detailed and intensive analysis of an entity or a component of a structure, performed to determine the factors underlying its success or failure.

A case study demonstrates how the problem has been identified, which solution has been chosen, but it must highlight the outcomes for a given area.

In general, a case study is structured in 6 to 20 pages, including graphical content (if available). In terms of format and content, the case study is divided into three main sections, named according to the subject and objective of the work:

- challenge / problem / hypothesis
- approach / solution / implementation
- benefit / result / completion

The case study focuses on a single issue, focused on presenting the solution or the benefit offered by the method / product in question.

Definition

*C. Robson*¹ considers that the case study can be defined as “a research strategy which focuses on a specific case that is interpreted in details, showing those detailed references about individuals, groups, organizations, taking into account all its contextual features. This requires the use of several complementary methods for the collection, analysis, processing and storing relevant information, both quantitative and qualitative”.

*R. K. Yin*² stipulates that the case study defines “a strategy of a research that requires empirical investigation about a particular contemporary phenomenon derived from a real life context, using multiple sources of information (interviews, questionnaires, testimonies, evidences, documents)”.

Designing the Case Study

The case study can be done by one person or by several persons, if they are working in teams. It is recommended that the whole team to be involved in the early stages of the conceptualization and definition of the problems to be investigated.

The Case Study Plan contains details about the ways of gathering the information to be used and the general rules to be followed by the whole team.

¹ C. Robson, *Real World Research*, U.K., Blackwell Publisher, Oxford, 2002, pp. 180-186

² R. K. Yin, *Case Study Research: Design and Method*, 2nd edition, U.S.A., California, Thousand Oaks, 1994, pp. 196-200



Structure of the Case Study

- **introduction** - it is that part of the case study containing essential information about the study plan, research, stages, all presented in a contextualized approach and perspective view of the elements (including the reasons for conducting research);
- **methodology** - as having the access to various sources of information, it must clearly define the necessary information, assessment and provision of resources (available or desirable), schedule activities of gathering, processing, analyzing and interpreting information, determine the required time periods;
- **questions** - there must be designed actually, in a coherent, complete arrangements for obtaining the necessary information through interviews, questionnaires, testimonies, evidences;
- **conclusions.**

Exigencies

- **the case study must be real** - it reflects a situation, a process, a phenomenon, an event in an organization or lived by a person or a group, possible to be happened in the past or will be happened in the future;
- **the case study must be significant** - it addresses a situation that is really important, a relevant process, a complex phenomenon, an event occurred in a organization or in an individual activity;
- **the case study must be instructive** - it promotes a useful tool for potential users;
- **the case study must be exciting** - it stimulates the interest of the people involved in the illustrated situation, analysis and/or interpretation;
- **the case study must be complex** - it includes a set of important and relevant information that make it useful for various activities.

"Resumed form" of a Case Study

1. Presenting the identified problems and proposed for analysis.
2. Context of the identified problems.
3. Strengths, weaknesses
4. Methods of operation and/or implementation (formal, informal)
5. Assessment of the analyzed problem and its definition
6. Research methodology and intervention
7. Evaluation, impact and dissemination of the results

Case Study in Education

The case study method was proposed by the Graduate School of Business Administration from Harvard. It was initiated in France, in 1926, by Andre Siegfried. Subsequently, it enjoyed a broader expansion in the higher education area, but also in education, in general.



In education, a case study can be a complex and unique situation - a project that implements an important event to be investigated in its clear context.

The questions to be answered by the case study are: "how" and "why" *a fact* has been happened (also *an event, a situation, a decision*).

From the purpose of the research point of view, function of which the cases are selected, R. Stake³ identifies three types:

- *The study related to the intrinsic case* - in which the researcher is oriented on the description of a unified phenomenon without the data to test the hypotheses;
- *The study of the instrumental case* - conducted to clarify a theory or a general problem;
- *The study of a multiple (collective) cases* - which attempts to generalize characteristics and mechanisms.

The learning process based on the case study requires active engagement and interactive activities for the students involved in a collective analysis and discussion related to a "case". They must perform the identification and examination of the alternatives for auctioning and making decisions, in accordance with their value system. Thus, the learning process based on the case study touches the cooperative learning and contributes to the development of the social behavior of pupils / students, whether the analyzing and solving of the case is made frontally, in groups or individually. In the last two cases, the stage for discussing the alternatives is achieved by the collective participation of the all students.

The case is a real situation-problem cut from the reality, which is valued from the educational context perspective, explained, analyzed, evaluated and solved in the collective activities of the pupils / students, which provide the necessary conditions to formulate new recommendations, conclusions, rules etc. The pupils / students explain their solutions or decisions making references to their acquired knowledge, laws and theories.

The learning based on the case study is an active method which has a number of advantages:

- it motivates the pupils / students intrinsically and involves them in related activities;
- it provides the ability to deal with real situations, and / or problems extracted from the reality;
- puts the pupils / students in a position to use the knowledge and skills they have acquired on making inductive and deductive approaches and discovering new action actions;
- represents an active and interactive exercise, based on arguments, insights and solutions;
- leads pupils / students to develop a critical attitude towards critical variants of solving the case, arguing rationally and selecting the optimal variant;

³ Stake, R.E. (1994). *Case studies*. In N. K. Denzin & Y.S. Kincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA, Sage



- requires collective debate, in which there will be exchanges of ideas and/or intellectual confrontations, argumentations, conclusions;
- involves all pupils / students to discuss and solve the cases through cooperation;
- makes the pupils / students to achieve the most complex levels of thinking and active learning, moving from “applying” to “analyzing, synthesizing and evaluating”.

The peculiarities of a case study are related to the presentation of a situation in its characteristic dimensions that allow a more global reflection on the real facts. In this situation, the specialist has the role of a consultant of the discussed case, and the teacher leads the learning and guiding process of the pupils / students, offers the necessary support, validates the solution and get the formative and summative feedback. In no case, the teacher will impose his/her own view on the questioned situation, but he/she will encourage pupils / students to be engaged more actively in the debate, promoting the criticism and proposing several options on how to solve the problem.

A collection of Case studies for Science lessons can be accessed at: <http://sciencecases.lib.buffalo.edu/cs/collection/>.

Case Study in the NanoTech Project

To design the case studies, it must be addressed topics where the implementation process takes into account illustrated, presented and developed components in the frame of the *Virtual Laboratory* created in the *NanoTech* project (<http://vlab.ntse-nanotech.eu/NanoVirtualLab/>). The themes are oriented on: *understanding the nano-scale, fabrication of nano-crystals, Lotus effect, nano-particles and ferro-fluids, fullerenes*. In addition, the topics can be debated and discussed around the resources included in the *Repository* database (<http://ntse.ssai.valahia.ro/>) - where video-clips, articles and other resources could be exploited, or in the *Competition Room* (where the students' posters for the *Nano Competition* are included).

For designing the *Nano Case Study*, the following stages will be taken into consideration:

1. Clear, precise and complete presentation of the subject (case), in line with the proposed objectives;
2. Clarification of any misunderstandings related to that topic (if any);
3. Individual study of the case - pupils / students must document the case, identify solutions to the case, and offer notes about the case;
4. Group discussion related to the ways of solving the case - analysis of the various options to solve the case, critical analysis of each of them; ranking of the solutions;
5. Decision taking about the best solution and drawing conclusions;
6. Evaluation of the way in which the best solution is determined, and assessment of the participants.

Possible variants for fulfilling the case study are:

- *The Case-Study-Method* - involves a complete presentation of the case, including the necessary information for solving the case;



- *The Incidence Method* - involves the complete presentation of the existed situation, but the necessary information are offered partial or not provided;

It is not recommended the method where the students do not have any complete overview of the situation and did not receive the necessary information to solve the case (in this format, they only receive the tasks, but after that, they must handle the tasks on their own efforts).

Like advantages, there will be identified and highlighted those which will arise in the process of implementation. Thus, there can be underlined:

- familiarizing the participants with real life-situations;
- enhancing students' knowledge and skills in real contexts, thus linking the theory with practice;
- developing the cooperation;
- developing the thinking;
- training and developing of cognitive and meta-cognitive skills;
- developing the communication skills;
- developing the investigative capacity;
- developing the decision-making capacity.

In addition, such activities have also several limits that must be identified and reminded:

- difficulties when selecting the relevant cases;
- difficulties on accessing the sources of information, necessary to solve the case;
- less experience of some of the pupils / students can create difficulties on finding the optimal solution, with adverse effects on the motivational involvement in the activity;
- time-consuming activities.

More, the proposed questionnaires come to conclude the obtained results, but also ensure a database for the pupils'/students' feedback which can allow a facile processing of the gathered information, and adaptations for future implementations.



Example

(taken from: http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=465&id=465)

The *Case Study* has two major parts: *Overview* and *Teaching Notes*. Also, it is recommended to include a *Comment section*.

1. Overview

AH-CHOO!

A Case Study on Climate Change and Allergies

Co Authors: Juanita Constible
Coastal Louisiana Program
National Wildlife Federation
bufohemiofhyrs@hotmail.com
Luke Sandro
Science (Biology)
Springboro High School
lsandro@springboro.org
Richard E. Lee, Jr.
Department of Zoology
Miami University
leere@muohio.edu

Abstract: As the carbon dioxide concentration of our atmosphere increases and our climate warms, the hay fever season seems to be getting longer and more severe. In this case study, students assume the role of a public relations specialist contracted to communicate the link between climate change and pollen allergies. The activity focuses on the importance of scientific skills to careers outside science, and is most suitable for a lower-level introductory biology, human health, or environmental science course.

Objectives:

- Work collaboratively on a problem.
- Interpret and prioritize data.
- Tell a story through graphics and text.
- Defend an argument.



NANO TECHNOLOGY SCIENCE EDUCATION (NTSE)

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Keywords: Climate change; global warming; allergy; allergies; allergenic pollen; allergens; allergic rhinitis; asthma; hay fever

Topical Area: Scientific argumentation

Educational Level: High school, Undergraduate lower division

Formats: PDF

Type/Method: Role-Play, Student Presentations

Language: English

Subject: Biology (General) Public Health Environmental
Headings: Science Climatology / Meteorology

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2. Teaching Notes (pdf file - 4 pages - available at:
http://sciencecases.lib.buffalo.edu/cs/files/ahchoo_notes.pdf)

Case teaching notes are intended to help teachers select and adopt a case. They typically include a summary of the case, teaching objectives, information about the intended audience and how the case may be taught, a case analysis or answer key, and references