# How Users Deal With Mandatory IT Artifacts

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## Abstract

This paper analyzes the strategies that users develop to deal with IT artifacts, many times adjusting them to their own interests, even in mandatory situations. The case study investigates the pattern of adaptations implemented by lecturers (the users) while using an academic portal (the IT artifact) in a university (the mandatory organizational setting). This object was chosen, because different interpretations of the artifact's flexible features allow for the existence of several distinctive patterns of use and adaptation behaviors among system users that were identified and analyzed. As a result, we depict a set of moves by means of which users either complied with the system 'as-is', refuted parts of it while adhering to others, adapted it, replaced components or complemented it, becoming co-developers of their own 'systems in use'.

**Keywords:** IT acceptance; IT appropriation; IT adaptation; IT spirit; IT negotiation

## Introduction

Since the introduction of computers to support organizational functions, which started in the 1950's, the use of information systems increased a lot in organizations (Hirschheim, 2012). However, in spite of all organizational efforts and strategies, users can use the technological artifact following their own perceptions and interpretations about it.

When analyzing the set of technological artifacts adopted by organizations, we realize that the great majority of these artifacts are presented to their users under mandatory conditions. The artifacts are previously selected and implemented by organizational decision makers with the expectation of achieving positive outcomes, according to their own perspective. Standard workflows, financial procedures, regular reports, supply chain relationships, and so on, will shape mandatory systems applied to any business process in an organization.

We understand that in mandatory settings, where users are obliged to use the technology, *IS success* will depend much more on 'how the users use it' than 'if they use it'. In strongly mandatory situations there are cases where users do not see usefulness neither ease of use in a specific artifact, but, as they have no choice, they cannot opt out.

Users have to comply with minimum expectations in using the IT artifact adopted by their organization. They can, however, follow different strategies in their relationship with the artifact. They can try to adapt themselves to use the artifact as expected by the developers, or they can try to adapt the artifact to their personal interests. This second alternative is the focus of the current study.

This paper analyzes the strategies that users develop to deal with IT artifacts, many times adjusting them to their own interests, even in mandatory situations. The case study investigates the pattern of adaptations implemented by lecturers (the users), while using an academic portal (the IT artifact) in a university (the mandatory organizational setting).

## Theory

Realizing that IT provides structures for organizational change, while, at the same time, the interaction of users with technologies makes other structures to emerge, DeSanctis and Poole (1994) proposed the Adaptive Structuration Theory (AST) that emphasizes the role of human actions and interactions in shaping a technology and choosing the ways it is used, arguing that

"people generate social constructions of technology" (p. 124), while interacting with the technology and with other individuals.

The social structures of an AIT (Advanced Information Technology), or its *structural potential*, can be described in terms of its *structural features* - "the specific types of rules and resources, or capabilities, offered by the system" (Desanctis & Poole, 1994, p. 126) and the *spirit* of this feature set – "the general intent with regard to values and goals underlying a given set of structural features" (p. 126).

The concept of 'spirit', presented in AST (Desanctis & Poole, 1994), can be compared to the concept of 'inscription' as defined by Akrich (1992), and it refers to "the way technical artifacts embody patterns of use, including user programs of action, [and] the innovators' beliefs, social and economic relations, previous patterns of use, legal limits, and assumptions as to what the artifact is about" (Faraj, Kwon, & Watts, 2004, p. 189). When an organization adopts an IT artifact to be applied in a process, it defines a 'program of action'. The planned tasks and the selected technology will form and inform the means to be applied in order to obtain the desired goals, as intended by the organization's decision makers. Users can refuse to conform to the designed 'program of action' and adapt it to their own interests, conditioned to the limits imposed by the organization to this 'flexibilization', based on the level of control it has on people and processes. When selecting and adopting a technology, the decision makers associate activities, procedures and even expected behaviors to those they expect to embrace the new technology. The 'right' appropriation of the IT artifact will supposedly lead to the intended outcomes and results, i.e., a desired use will be one that contributes to the achievement of intended goals. If users decide to use only minimal or limited features of the proposed IT, or if they use it in ways that had not been planned, that may result in planned results not being achieved or diverting from the original intentions.

However, it is often assumed that the developer's (or the organization's) intentions – the *spirit* imbricated in the artifact – are the 'right' ones. Why could not the users have better solutions for a problem, which would interfere with their relationship and the appropriation of the artifact than the developers? Our understanding here is close to Griffith's (1999), who envisions the possibility of some features being created by users without the interference of formal designers. The didactical model of how technology features evolve, presented in Figure 1, speaks for itself.
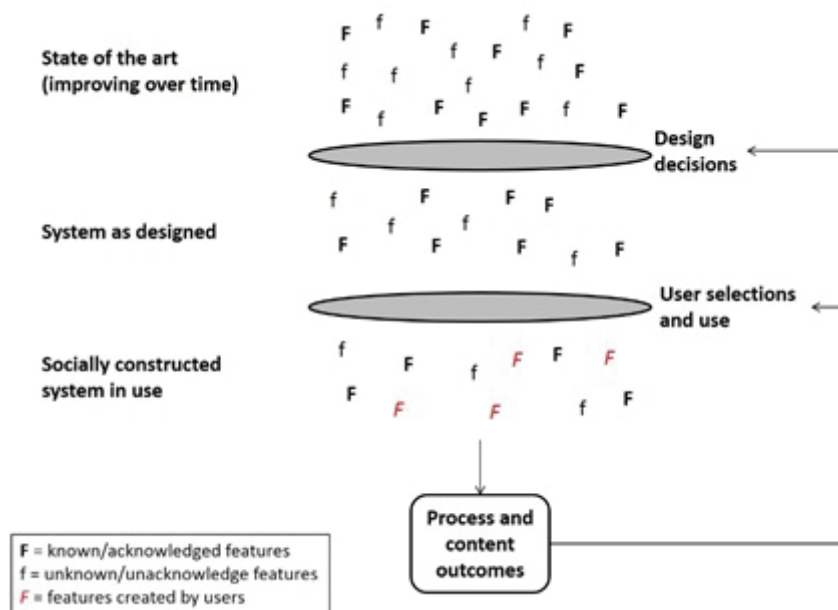


F = known/acknowledged features
f = unknown/unacknowledge features
*F* = features created by users

**Figure 1.    Conceptual model of the creation of technology features (Griffith, 1999).**
We also agree with Faraj *et al.* (2004) when they say that researchers neglected the study of how technology development occurs. There are many discussions about how new technologies come into existence but the studies about how technologies evolve are too focused on the designers' perspective and do not pay enough attention to how users transform technologies while using them.

The designers try to optimize fit based on the knowledge that they have about the tasks and the potential users involved in the process where the artifact will be applied. When developers decide about 'the best way' an artifact should be built and used, there is a risk they trap individuals in a situation where there is just one way of correctly using the artifact, not leaving space for improvisations nor adaptations (Redström, 2006).

Mackay (2000) coined the term *co-adaptation* to identify the transformation of users and artifacts while in use. Individuals adapt the available technology to their own purposes, as well as they adapt themselves to the new presented technology. They do it by using and reinterpreting the artifact. That author uses psychological lenses to analyze the phenomenon at individual and group levels. This differentiates her work from more sociologic approaches to the organizational level of analysis. Actually, her objective is to analyze the co-adaptation process between users and technology as a response to cognitive overload, when dealing with the artifact.

If the designers' intentions are implemented in a closed and determined way, there is no space for ambiguity. In fact, there are only two possibilities, either 'using' or 'not using' the artifact in the way envisaged by the designers. A different situation happens when designers implement the artifact allowing the users to define new forms of appropriation, based on their different interpretations on how the artifact should be applied. The 'inscription' (or 'spirit') may intend and/or result in a dictatorial unchangeable rule or represent just a possibility, among many others that can be constructed by the users.

**Methodology**

A case study was conducted in a Brazilian university (the organization) that is using an *academic portal* (the IT artifact) to help lecturers (the users) with their teaching activities.

This specific case was chosen because the academic portal has been in use in this organization for many years as a mandatory system and the relationships between users and the artifact went through several stages, being perceived differently by different users and also with variations over time.

Academic portals are mainly implemented as mandatory systems due to their standardizing and controlling features, but we also find universities that offer them in a voluntary basis. In both cases use is very flexible and ranges from the application of a basic set of communication features (such as e-mail, group lists and file transfer capabilities) to more advanced sets of distance learning possibilities (such as virtual classes, video casts, on-line tests, wikis etc.). Different interpretations of these customizable features allow for the existence of several distinctive patterns of use and adaptation behaviors among system users that were identified and analyzed.

Primary and secondary sources were used in this research. Documents (secondary data) included manuals and commercial advertising available in the developer's website. Interviews and observation were sources of primary data. The main data collection happened from June 2013 to September 2013, but the interviews and document analysis also provided longitudinal data about use and the relationship between users and the IT artifact.

The participants were 14 lecturers, who were interviewed independently. There were 12 males and 2 females, with 13.2 years of average experience in university teaching. The average time at this particular institution was 8.4 years (ranging from 4 to 25 years). The interviews lasted 27 minutes in average (the shortest lasting 14 minutes and the longest 58 minutes).

The interviews were recorded and full transcriptions were prepared. The transcription of the interviews, the manuals about how to use the portal, and the promotional materials used by the developer were coded using NVivo 10 software for qualitative analysis.

**Analysis and Results**

The Brazilian educational institution where the study was conducted started its education business in 1972, offering preparation courses for students who intended to go through the tough selection processes of good universities in the country. After achieving business success with these preparation courses,  the organization applied its model to all educational levels, from elementary school until university. In 2013, the group had more than one million students from kindergarten to university being taught according to their methodology, either in their own institutions or in franchise schools. Nowadays, the methodology involves course books, class materials, educational software, and educational Internet portals.

In 2007, the university decided to use an academic portal to support its undergraduate and graduate courses. Lecturers should publish their syllabuses, and content for all classes. Everything should be available at the portal, one week prior to the beginning of each academic semester. For each class, they should publish the list of objectives, the references and any other content that could be used during class (slides, texts and exercises) or as additional material for students' reference, afterwards.

The organizational workflow forces lecturers to, at least, use the portal features to inform grades and attendance records. This can be considered the minimum level of use, since there is no way to inform grades and attendance without using the academic portal.

Considering the number of available features, the other extreme of use, full use of all features, would be hard to achieve. Users are in the range that goes from making minimum use (to pass the organization's assessment) to a regular use of the main features related to the teaching and learning processes (inclusion of syllabus, lectures planning, assignment publishing, assignment submission, questions database, bulletin board and forum). Based on how they use the features, patterns could be identified and classified, related to their appropriation moves.

There are users who apply the artifact features as expected. DeSanctis and Poole (1994) identified this behavior as 'direct use' in their classification of appropriation moves. Lecturers who behave this way use the tools as they were planned and implemented by the developers. They can use some of the features available to them (partial use) or they can try to use all features (full use). As the organization invested time and money to implement the artifact, extensive use of these features is desired by the organization. The obtained results when they involve full use help justifying the original decision made about the artifact's implementation. We can attribute 'direct use' to designers who successfully understood users' needs and implemented them in the artifact. But we can also consider it as part of the users' attitudes to conform to the desired organization's intentions. In the university's mandatory setting, a few users confirmed that they use the tool as proposed by the university and consider that as part of their job. One of them, who was already at the institution when the implementation began, years ago, remarks:

> Since the organization adopted the portal, and has recommended its use, I try to use it. I chose to concentrate everything in the portal. My communication with

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students is made through the portal. The content of my lectures is available in the portal. Any assignment is presented in the portal. Obviously, I am trying to increase the use of the portal (P12).

It should be highlighted the fact that, although we are talking about a compulsory artifact, users do not feel completely obliged. As stated by P12, above, he 'chose' to concentrate his materials in the portal. Not that he thought he 'needed' to do that. This perception of a compulsory system, but that the user can use according to his/her own interpretation, was present in most of the interviews.

Full use of all the features was not identified among any of the interviewees. This is understandable, considering the increasing number of features that are available in each new version of the artifact and the lack of time and interest of users to master all those features.

We prepared some diagrams to graphically represent the types of adaptations we found in our field work. These diagrams compare the artifact adopted by the university, including all the available features presented to the users, and the technology being effectively used by the lecturers in their daily activities. The diagrams were inspired by Griffith (1999), but we are going into more detail in our attempt to show how appropriation moves change the way technology is used.

The first diagram, shown in Figure 2, represents the situation in which a user is using all the available features in his/her activities. This full use of such complex artifact would represent a complete faithful appropriation of the adopted artifact, because the user is not challenging any of the features that were included by the developers.
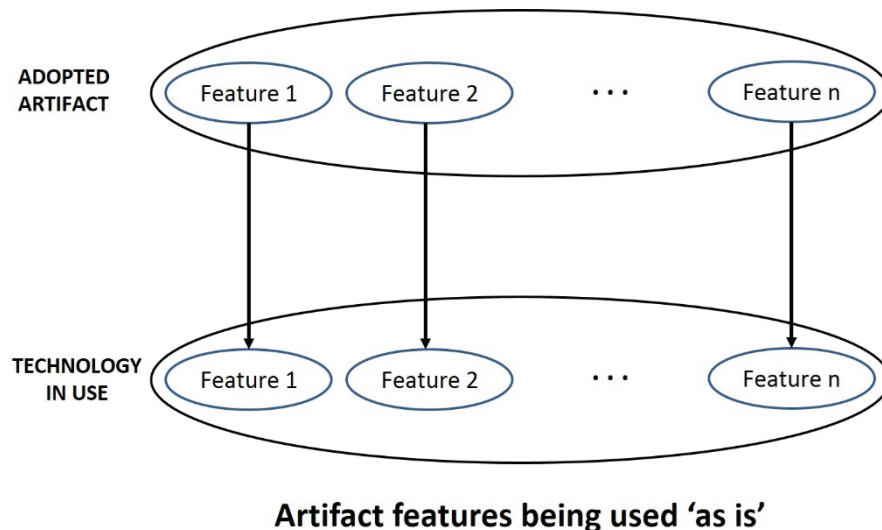


**Figure 2.**     **Use of artifact features 'as is'.**

Besides the use of features as they were conceived and implemented by the developers and the organization that adopted the artifact, we noticed some movements of adaptation, replacement and complementation of features. Individuals and groups evaluate the adopted artifact and apply strategies to transform it into something more adjusted to their needs or interests.

While some individuals and groups opt for a simple 'to use or not to use' dilemma there are others that appropriate the IT artifact in a more complex way, interpreting the artifact and its features in different manners and deciding to change it through an appropriation move.

It was possible to find clear examples of structures being blended with, or related to, other structures in the appropriation moves performed by many users, as foreseen in AST models (Desanctis & Poole, 1994). Some of the lecturers participating in the research talked about the artifact and expressed the structures they formed while dealing with it. They explain how they *replace* – "I do not use the university's e-mail, I prefer to use my own" (P5) –, *combine* – "the communication tool is weak, but I connect it with Facebook" (P1) –, *enlarge* – "today I go to classroom carrying nothing or just a flash drive as a backup" (P10) –, and *contrast* – "I compare the portal to the physical bulletin board that we have in every classroom" (P3) – the artifact's features.

Analyzing the explanations about the use of the artifact's features we classified the transformations applied to the artifact by the users of the university portal in four main categories: (1) refutation of an available feature, (2) adaptation of available feature, (3) replacement of available feature, and (4) complementation with unavailable features.

Refutation occurs when a user selects some features to be used in his/her activities and refutes the use of other available features. This refutation occurs due to incompatibility between the user's interpretations of the artifact and the developer's intentions in offering this feature in the adopted artifact. In our field research we found a participant who refused to use the profile page by means of which lecturers could present themselves to students. He pointed out his opinion about this feature: "there is a profile page, but I never visited or changed it. I did not publish my *resumé* or my picture there. Students have to know me from the classroom. The portal should not try to be a replacement for my face-to-face relationship with students" (P10). Another example is the use of wiki and blog features available at the academic portal. Nobody among the interviewees perceives usefulness in those features. The diagram in Figure 3 shows the situation (appropriation move) where the user refutes using an available feature because his interest and needs are not in line with the designers'. We consider this level of use as a "partial as is" use. The user does not try to change any feature, but s/he declines using some of them.
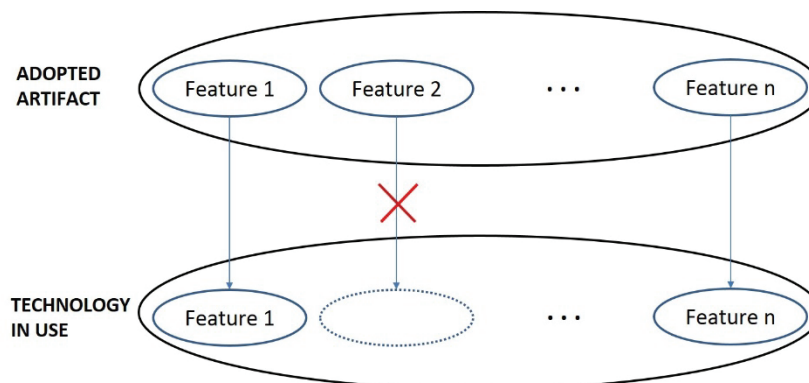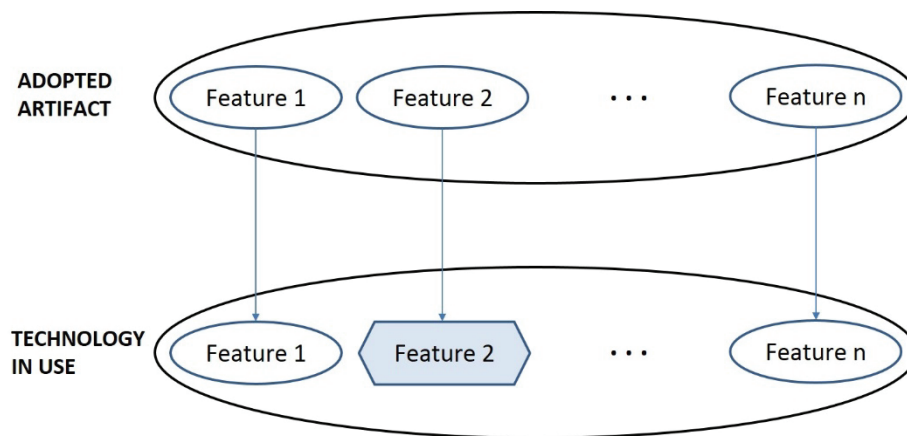


**Refutation of available feature**

**Figure 3.    Refutation of an artifact's available feature.**

The adaptation of an available feature occurs when a feature that is present in the artifact is used in a different way than it was planned. Lecturers evaluate, interpret and repurpose the available features. The program of action inscribed by the developer in the artifact is rejected or bended by the user. An example is to use the forum tool to organize a question database, to make it easier for students to prepare themselves for the exams, as reported by one of the lecturers: "I prepare a first question about a text my students are reading and post it in our online forum. Then, the first student in the students' roll has to answer it and place another question for the second student. This goes on until everyone has had a go. I am sure that was not what the forum was conceived for, but it is a very good tool to obtain the students' engagement in creating questions that will help them reflect about the content discussed in class".

The diagram in Figure 4 shows the situation (appropriation move) where the user uses an available feature in a different way than that planned by designers.



**Adaptation of available feature**

**Figure 4.     Adaptation of an artifact's available feature.**

The replacement of an available feature happens when the feature is present in the artifact, but the user prefers to use another structure to perform the task. S/he behaves this way because there are perceived advantages in doing so. The task is completed and the results are satisfactorily obtained, but it is performed by replacing a feature from the artifact by another one the user finds available somewhere else. Again, the artifact is used in a different way than conceived.

> In the interviews, several lecturers showed a preference for other file sharing services that provide the same kind of service as the file sharing features available at the portal. To justify this preference they explained that the preferred services are simpler and more flexible than the features offered by the portal. Six of the fourteen interviewees mentioned that they use Dropbox as a service to share content with students instead of using the portal capabilities. They explained that the Dropbox service is simpler than the portal feature to perform the same task.

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Another example is the use of other communication tools such as personal e-mail programs and instant messaging applications. The majority of the participants prefer to use other e-mail services due to delivery speed and no limitation of message size.

Figure 5 represents this replacement strategy. A feature available in the adopted artifact is replaced by an equivalent feature from a different artifact adopted by the user. The task is accomplished and the desired outcomes are produced, but the organization's adopted artifact is put, at least partially, aside by the user.
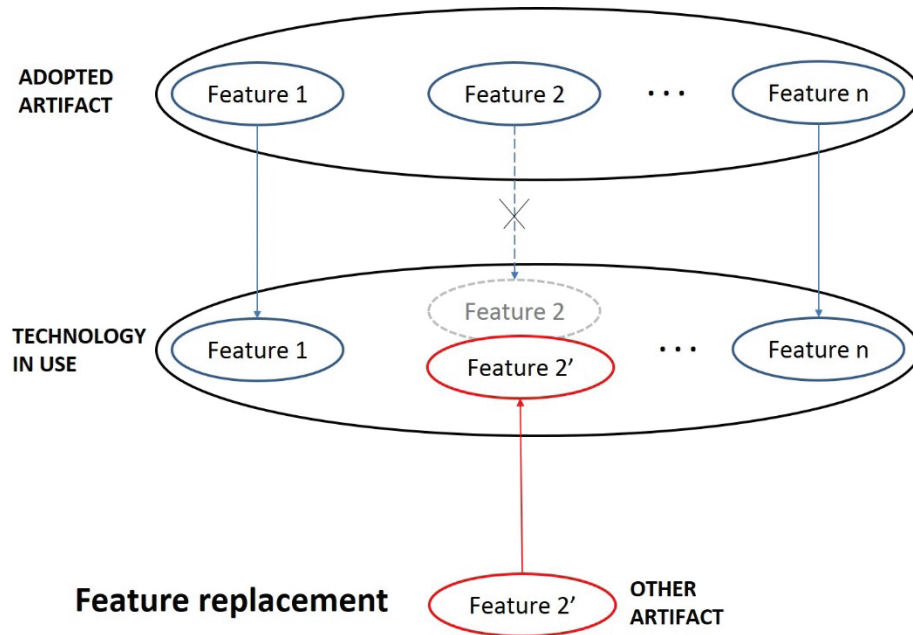


**Figure 5.    Artifact feature replacement by another feature from a different artifact.**

The inclusion of a complement in the absence of a desired feature is a different possible adaptation to the artifact. In this case, there is a feature that the user would like to have available in the artifact, but which is not there. The user has to adopt a different structure to complement the artifact. There were two examples of this kind of appropriation that were presented by the interviewees.

Some users adopted a spreadsheet with all the required fields to plan the course syllabus. The table with these fields had been prepared by one of the users who considered it a better way to plan and organize the information prior to feeding it to the portal and then it was shared with other lecturers. This feature could be offered as an input option to publish the syllabus, if there was a design feedback cycle as proposed by Faraj *et al.* (2004) and Carroll (2004), but it is not. It would save users a lot of time in their own opinion.

Another example is the use of on-line forms to obtain information from students. Some personal information about the students is available in the university databases, but some lecturers would like to know more about their pupils, and directly from them. What is their previous professional experience and graduation perspectives (remembering that many undergraduate students in Brazil are part time students, as most are already in the labor market)? Those lecturers use on-line forms such as Google Forms, SurveyMonkey and Qualtrics to collect the desired information.

The diagram shown in Figure 6 presents the situation where the user adds a feature that is not available in the adopted artifact to his/her technology in use, adopting other artifact as a complement.
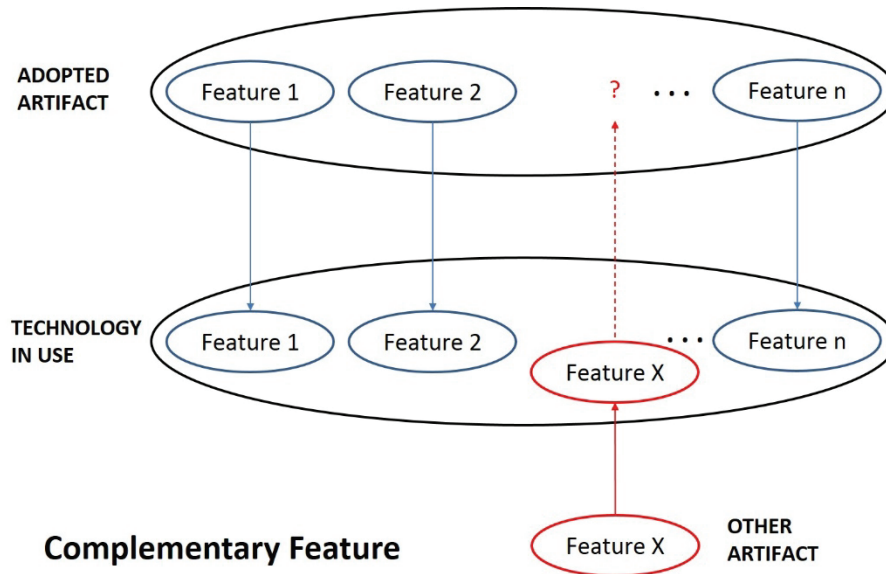
Figure 6.    Adoption and use of a complementary feature.

The information about desired features, not yet available in the adopted artifact, would also represent a crucial input for future development cycles. This information should complement the information on features users refuse to use, those they adapt and those they replace to provide rich input to new design efforts.

Finally, Figure 7 shows a summary of all types of adaptations we found in our researched case.
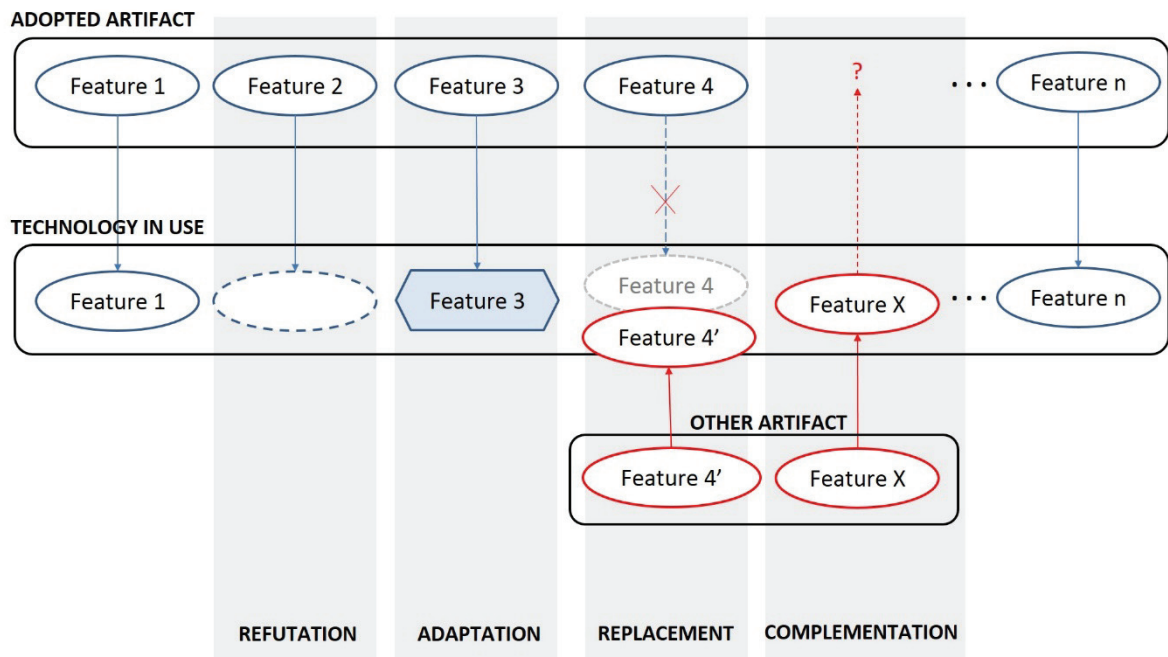


Figure 7.    A typology of adaptations found in this field research.

## Conclusion

One question we intended to answer with our study was: "Do users use the IT artifact as expected by their organization?" Based on our analysis of this case we can affirm that they do not always use the IT artifact that way, even in the case of compulsory artifacts. They try to maximize their own personal results at the same time they look for minimizing the effort to comply with organizational requirements. This means that users, even in a mandatory situation, use as little effort as possible to comply with monitored and controlled expectations, while they try to extract the maximum advantage of using what 'fits them' better in accomplishing their duties.

We were also and mainly interested in investigating "how users appropriate the IT artifact in their activities" . Our results show that this appropriation process, that applies appropriation moves, results in changes in the final solution being used (or the technology in use). We proposed some models that describe each of those situations. Far from just using the artifact as it was adopted by the organization (in an 'as is' manner), users refute features, adapt them so that they fit better their own interests, replace features using other artifacts available to them, and even adopt complementary artifacts to accomplish their objectives (organizational or individual).

The case study also showed us that the studied artifact, even as proposed by its designers, has been changing since its initial implementation several years ago. Different interpretations about the artifact emerged in the group of users, which surely changed the way they use the artifact. Some change may also have happened in the designer's interpretation of what the real 'spirit' of the IT artifact should be, over time, although this was not part of the scope of this study.

A limitation of this research is that we used only one case to analyze the phenomenon, which brings a problem of generalization of any result. Another limitation is related to the interpretive perspective adopted, which could bias the analysis toward the personal interpretations of researchers. Other interpreters could find different interpretations from the collected data.

We think however that, even if the situations we spotted here are not the common rule, they represent possibilities to be considered in the development and implementation of complex systems, for which strict control structures are either unfeasible or undesirable due to the rigidity they could bring.

We showed that there are 'black swans' in the lake. Future research could concern with how often those black swans exist in the corporate environment. Future research could also be focused on understanding how adaptations affect desired outcomes. Are the obtained results different between faithful and unfaithful appropriators? Other curiosity is related with the antecedents for each type of adaptation found in our field work. Are adaptations related to user's or artifact's characteristics?

Developers should constantly investigate 'what' users would like to have available in new versions of the artifact and one way of doing that is looking for their improvisations and planned actions, which lead to the adoption of a technology in use that was not what had been thought of by the designers. By doing that, and considering that there is at least some alignment of purposes among developers and users in their attempt to improve the efficiency and quality of the process that leads to expected goals, they would have access to invaluable information to help them with future developments.

At last, the case study provides us with good evidence that, more important than studying the original acceptance of an artifact, it is to analyze the way its use unfolds. Users, artifacts and designers will keep interacting. Different perceptions of the artifact will keep being negotiated, as the parties struggle to reach a (possibly impossible) agreed meaning for the proposed technological solution. If and while there is no agreed problem, there cannot be an agreed solution. Organizations should be prepared to deal, and to respect this diversity and maybe even use it to burst internal creativity and innovation cycles.

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