What Clippy and Tux Can Teach Us:

Incorporating Affective Aspects into Pedagogy

Teri Schamp-Bjerde, adjunkt i engelska
teri.schamp-bjerde@hkr.se

Abstract

Human-Computer Interaction (HCI) is an umbrella domain for many areas of study. This paper will look at those topics of HCI known as affective aspects. Affective aspects investigate emotional responses that the user communicates, both verbally and physically, when working with a computer including before and after the work is done. This paper examines the question of improving pedagogy and curriculum, if teachers are more aware of some HCI affective aspects. Clarified and discussed are three areas of affective aspects known as affordances, constraints, and anthropomorphisms. Posited is the need to aim for positive emotions as a learning task goal, as well as increasing positive backwash when working with computers and computer programs, as opposed to any engagement resulting in negative ones. Another aspect considered is how and why a user will give underlying human properties to objects, in this case the technology used. Finally, a reflection is given on how consideration of affective aspects can help teachers imbue technological pedagogy when creating a curriculum for a more positive student experience.

Keywords: HCI, pedagogy, affective aspects, technology
Affective Aspects

Bridging technology and human usage is becoming more of an underlying issue in teaching, especially with what is expected by the user – both student and teacher alike. Even if we live in this age, it does not imply that all students, nor teachers, are technologically savvy. Consider first the individual and his/her possible support needs; consider secondly, what one expects from technology as compared to the actual reality of using it. Our digital age is speeding up and surpassing general society. Teaching and work are becoming more compact as employers require more of the employee, and less time for employees to achieve their goals. More often than not, there are times when technology moves too fast, and the time to learn seems to have already passed.

We have all been there when the computer does not respond to our keyboard or mouse input. Many of us have had a sinking feeling as a document, piece of knowledge or some important information that we need hangs in the balance of not being saved, or being completely lost to a machine, and profoundly knowing that there is nothing we can do to prevent it. Nevertheless, many of us have also had that joyous feeling when we receive an email from a loved one with happy news, or even a simple item such as having accomplished a task on the computer without it misbehaving. These examples show that one machine can have a huge emotional impact on us as humans. We live, eat, and breathe with the technology in front of us, or hidden from site, but that technology sends us, sometimes daily, on an emotional roller-coaster.

As teachers, should we not consider this when requiring our students to navigate the same emotional roller-coaster we experience with the curriculum we employ and the requirements we require?

One area within HCI is called affective aspects, a well-known part of the technology field, giving researchers, and those creating computers and computer programs, an understanding and consideration of the emotional effects these devices have on us, the users. Catalysts drive one’s emotional state, how actions are perceived, how we interpret knowledge, one’s own impetus and alertness are regarded, as well as judgement of the event that is happening. Table 1 (see next page) shows an abbreviated composite of (Akgün, Akilli & Cağitay, 2011) groupings of different areas of possible emotional types, and possible resulting repercussions when actions started by a catalyst occur. These results, joy – distress – resentment, are emotions that all technology users know intimately. As teachers, there is a need to be aware of these emotional results, as it is the technology, and not the student that can be at fault.

Affective aspects are linked to the human element that must be considered when using any technology in the classroom. This area of affective aspects has three child areas that this paper will broach: affordances, constraints, and anthropomorphism. By understanding more of these three areas, it is hoped that this will increase teachers’ technical pedagogy skills when deciding what technology they will require their students to work with.

Affordances and Constraints in HCI

There are many actions that humans do unconsciously, blinking, swallowing, or even scratching. Yet, there are also many actions that we can do without thinking about them (habitus conceptus), such as opening a door (turn the knob), answering the phone (pick the phone up and say “hello”), and turn on the light (flip the switch).
to name but a few. Beyond these two, are those actions that we must think about. We have to ask ourselves “can I do this”, or “is this possible”. We can guess if such actions are possible or impossible from previous knowledge, we can even conclude that we just do not know. A case in point would be if we know if there is enough gasoline in the car to get to the gas station. Norman (2011) explains the original term affordances that psychologist Gibson gave as to connecting the “actionable properties between the world and an actor (a person or animal)” (p. 39).

Table 1: Emotion types and their possible affects (Akgün, et al, 2011)

<table>
<thead>
<tr>
<th>Emotion Types</th>
<th>Specification</th>
<th>Types(name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Specification</td>
<td>Types(name)</td>
</tr>
<tr>
<td>Well-being</td>
<td>Appraisal of event</td>
<td>pleased (joy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>displeased (distress)</td>
</tr>
<tr>
<td>Fortunes-of-others</td>
<td>Presumed value of an event affecting another</td>
<td>pleased about an event desirable for another (happy-for)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>displeased about an event undesirable for another (gloating)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>displeased about an event desirable for another (resentment)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>displeased about an event undesirable for another (sorry for)</td>
</tr>
<tr>
<td>Prospect-based</td>
<td>Appraisal of a prospective event</td>
<td>pleased about a prospective desirable event (hope)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pleased about a confirmed desirable event (satisfaction)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pleased about a disconfirmed undesirable event (relief)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>displeased about a confirmed undesirable event (fears-confirmed)</td>
</tr>
<tr>
<td>Attribution</td>
<td>Appraisal of an agent’s action</td>
<td>approving of one’s own action (pride)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>approving of another’s action (admiration)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>disapproving of one’s own action (shame)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>disapproving of another’s action (reproach)</td>
</tr>
</tbody>
</table>

With regard to computers, we expect actions that we perform to produce a certain result. As a result, we receive positive or negative emotional feedback depending on the result, which can be labelled as backwash. To further, clarify affordances Norman (2011, p. 9) states that, ...

...the term affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.
If one drags & drops a file to a folder, you can expect to open said folder and know the file is within, if it is not there, negative feelings might arise. If one double clicks on a file, a folder, or a program icon, one expects specific reactions as the consequence of ones actions. One can sum up these as affordances when connected to HCI, those clues in the object that lead to actions that the user performs, and that those actions give precise results that the user expects, and hopefully they are positive results.

As a complement to affordances, there is an area termed constraints. These constraints are the limits embedded in a program or object. As opposed to a restraint, constraints are not personal, it is the object and its properties that define them, and as such cannot be changed. Here we find items that let the user know that they have an action that does not give a result, or one that needs further actions (choices) to complete before the desired result is achieved. The most obvious constraints are those with accompanying negative sounds that give notice to the user that the recent choice made cannot result as finished; it could also designate that more choices are required to complete the action.

One familiar example is the drop-down menu. In MS Word’s 2003 edition, the task bars have drop-down menus, where the user is asked to then continue choosing options until the desired result is accomplished. Affordances and constraints are used here in tandem, to help guide the user.

As with affordances -what is expected to be found in the drop-down menu - the constraint is that some of the items in the drop-down menu are “faded out”, and not a possible choice. The program is constraining the user, restricting the options to those that can be successfully applied at the present time. Changing objects in the text will automatically produce a new set of affordances and constraints that the program will let you avail yourself of, and in this way, the computer program assists in instruction of the user. Sometimes the user is familiar with these affordances and constraints and expects them. Yet, sometimes the user will engage in the same actions and the constraints will be unexpected. When this happens, the program reverts to the user, and he must find the underlying reason for said computer response. Depending on the user’s knowledge, either he will be able to solve the problem or not; either way, it is most likely to result in a type of negative backwash.

**Anthropomorphism**

The area of anthropomorphism looks at the human traits and characteristics that are given to inanimate objects, as well as other non-human objects. Traditionally, we see this in our lives, how we refer to a boat as “she”, or give a name to a cars or mobile phones. This can more commonly be found in literature, e.g. in A.A. Milne’s *Winnie the Pooh*, or Lewis Carroll’s *Alice in Wonderland*, where animals have human looks and traits; even A.C. Clarke’s 2001: A Space Odyssey and the ever-present computer/human “HAL9000”, with “his” red “eye”. Each of these is a non-human object or animal that has been imbued with human traits and properties. The anthropomorphic approach to human-computer interaction involves designing a user interface to possess human-like qualities, the goals of using these human qualities vary, yet for most, it is an attempt to help the user to engage positively with the object, i.e. computer.

One of the main areas of being human is that of basic courtesy, and when an object responds as a human being and is polite, the actual user response can vary. When the
object needs more information, it asks for it. If there is a mistake in the users input to the program, the latter is set up so that the request will seem “human”. If one was to enter an invalid URL (uniform resource locater), a web browser might respond with the following options:

![Google Chrome response](image1.png)

**Image 1: Pleasantries – Google Chrome (2011)**

![Mozilla Firefox response](image2.png)

**Image 2: Pleasantries 2 – Mozilla Firefox (2011)**

Images 1 and 2 depict typical *courteous human* behaviour as the response of the web browser when it does not know how to respond. “Etiquette rules often serve as coordination devices … and can be seen as enacting an interactional function” (Bickmore, 2004, p.43). These types of etiquette rules are a part of what we consider a civilized society, and they create an illusion that equates a comfortable environment.

This can also be seen when there is a dialog between two or more individuals; there is a need for a response in order for the conversation to continue. Without these types of courtesies, the user might not immediately realize that there is a problem and try to find a solution. In Images 1 and 2, the response information from the web browser is clear to the user, almost as a friend would reply, however Google Chrome, or Mozilla Firefox are programs, not friends. Google Chrome’s “oops” puts the fault clearly on that of the browser itself, not the user. The browser tries to make the user have a positive emotional result by using an informal colloquialism that is friendly. With the web browser Mozilla Firefox (Image 2), “make sure” and “try” give the user
suggestions as a human friend would. At times, both can create positive responses in the user, yet at other times, especially depending on previous successes of the user, a sarcastic feeling and negative emotions might arise.

One of the more dubious and infamous anthropomorphic objects in a computer program that one encounters is “Clippy”, the paperclip, Microsoft’s Office Assistant (Image 3). Common sense tells us that paperclips do not have eyes, nor can they communicate, yet this one is meant to assist the user as it might see what is wrong and proffer help.

![Image 3: Clippy the paperclip (2011)](image)

Image 4 is the Linux penguin, Tux who greets users during the installation of the Linux operating system. Again, we know that penguins do not talk, but this one is cute and can result in the user feeling happy and comfortable, perhaps resulting in more confidence as the image is harmless and the computer, in turn, should then be harmless.

![Image 4: Tux - The Linux Penguin (2011)](image)
These three different types of affective aspects (affordances, constraints, and anthropomorphism) are important, as they let the user understand that there are almost always human traits written into most programs, as seen in both the responses in Google Chrome and Mozilla Firefox above. Even now, computer programs, such as chat-bots and robots, have physical characteristics of humans, and they can employ vocal tones that represent and mimic human voices. These traits help to result in human reactions when using machines, more importantly, that those reactions we have during usage play a central part in daily positive and negative experiences when interacting with computer programs.

**Using Technology Day by Day**

In our new century, teaching needs to incorporate different skills, one of the major ones is being able to use a computer with different programs. As a student, one is asked to write essays, create presentations, and gather knowledge, and teachers to implement tasks that are within the general area of the internet that pupils use. All of these tasks are used in concert, with the aid of a computer. When creating a new student assignment that requires technology, one should take into account what is being used. Most students will choose the traditional computer with conventional programs to complete any of these tasks, yet some will use other types of technology (cameras, video recorders, editing software).

“Knowledge is co-constructed with peers or experts and through immersion in a social context” (McKay, 2007, p. 156), nevertheless, the experiences are uniquely individual. These experiences are also shaped by any pre-existing knowledge that the individual has. Pre-existing knowledge can help the student to understand the technology being employed. It can also create uncertainties and negativness when the student has expectations that are not met. As an example of pre-existing experience and how negative backwash can replace a positive one, we only need to look at the anxiety felt when experiencing and working with a new Graphical User Interface (GUI) of a new program, or when learning a new edition of an already familiar program.

A GUI is the interface that one interacts with when a document, program, or just your desktop screen is seen. One of the original design ideas for the interface originated with the Xerox Company and called WIMP, this being an acronym for windows, icons, menus, and pointing devices. With the advancement of technology and computers, the WIMP design evolved into the GUI we know and use today that is more versatile and interactive (Sharp, Rogers & Preece, 2007, Ch. 6). In 2007, Microsoft released a new version of its widely used text editor, Microsoft Word. One item that created a high anxiety level for many was the new GUI.

Images 5, 6, and 7 below show the conventional menu design that Microsoft has employed for over ten years in its text editor, Microsoft Word. In Image 5, one sees that the drop-down menu has been activated by placing the cursor over a command in a toolbar and clicking on it once. The resulting action opens up the abbreviated commands so that a button may be clicked upon, thereby activating it. To open the full-length command list seen in Image 6, one must then click on the double arrows at the bottom of the list in Image 5. In Image 7, the traditional toolbar forms are shown. These are usually stacked (as shown) at the top or bottom margins, and it is possible to float these toolbars anywhere in the document.
After more than ten years of the same GUI, the new design was what many called, a “huge step backwards”. Reviews were not promising, as more than 68% of people polled gave it a 1-star rating, while 82% gave it 1 or 2-stars. (CNET.com, 2011)

As seen in the MS Word 2007 edition (Image 8), a new GUI called a *ribbon* works with tabs, groups and box launchers instead of the toolbar and drop-down menu that had previously used in MS Word. Difficulties that could lead to negative backwash for the user are inconvenience of learning a new GUI, a new file format that was not
compatible with the MS Word 2003 edition, and no modification of the ribbon was possible.

An interesting result was that a programmer created an MS Word 2003 GUI for the 2007 version. This can be installed so that you visually interact with the MS Word 2003 version, even though the new version is invisible and “underneath” this visual overlay, and is free for download. As a positive backwash result we find that MS Word 2007 does have an option to save your document as a pdf file, there is the increased efficiency of adapting what is written to blogs, as well as a specific button for adding a cover page. Finally, unless the user is completely comfortable with computers, or has time and a positive attitude toward learning new programs, using newly released program versions that differ from previous ones could result in making assignments more difficult than intended by the teacher, and hence a case of negative backwash.

**Reflections: HCI and understanding the pedagogy**

During the teaching process, there are different core curriculums that need to be met by every teacher. These are based on guidelines and regulations set by the school, county, and government, beyond these, parents, and guardians with their positive and negative comments and criticisms are to be considered. Burnett (2009) shares her thoughts in that technology can be the means to transform education in many ways, yet what is meant by this “transformation” is not universally agreed upon nor specified. As a result, there are many people engaging in the use of technology and being “transformed”. Of those making use of technology in the classroom, some are trained in the area of education and its sub-components, including information and communication technology (ICT); many, however, are not. Deciding to integrate ICT components is not the problem as schools are mandated by the government to do so; the dilemma we as teachers face is how to be aware of these affective aspects as part of our pedagogy.

The more we consider human traits in our technology, anthropomorphism, the more expectations we have that the technology we use will help us solve our problems. Such is not yet the case. Users learn in many ways visually, auditorally, tactilly, or any combination of these. When creating any assignment for students using inquiry, task, project or problem-based methods, or any other method that incorporates a technical component, there is a need to consider affective aspects, especially all positive or negative backwash that is experienced by both student and teacher; a continuous evaluation should be in place whenever technology is used. Learning to use new computer programs in a short space of time should include workshops; a group effort can result in the dissemination of needed computer knowledge between students and teachers, and can promote positive backwash such as solving dilemmas in a group and increasing unity in the group.

To conclude, I encourage you all to contemplate your own, and your colleagues’ experiences when Kristianstad University upgrades the computers and operating systems, particularly with regard to changing from drop-down menu to GUI to a ribbon-based GUI in the new MS Office. During this time, look for these affective aspects written about in this paper, and discuss this and your experiences with your colleagues. Most importantly, remember *affordances, constraints, and anthropomorphisms* when creating multi-media components for your courses.
References:


