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Delineato: Designing Distraction-Free GUIs

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***Abstract*—**A large amount of software products offer a wide range and number of features. This is called featuritis or creeping featurism and tends to rise with each release of the product. Feautiris often adds unnecessary complexity to software, leading to longer learning curves and overall confusing the users and degrading their experience. We take a look to a new design approach tendency that has been coming up, the so-called "What You Get is What You Need" concept that argues that products should be very focused, simple and with minimalistic interfaces in order to help users conduct their tasks in distraction-free ambiences. This isn't as simple to implement as it might sound and the developers need to cut down features. Our contribution illustrates and evaluates this design method through a novel distraction-free diagramming tool named Delineato Pro for Mac OS X in which the user is confronted with an empty canvas when launching the software and where tools only show up when really needed.

***Keywords*—**Diagramming, HCI, usability, user interface.

I. Introduction

MANY software products are designed with a mindset in adding as many features as possible in order to create added value for users and customers. This development process is more driven by market behaviors rather than usefulness and real value. In fact, users rate these types of products as being "better" and more "complete" compared to other products that offer fewer features. This phenomenon – named by some as "creeping featuritis" [1] – also helps developers and companies to justify higher prices for their products. The main issue is that featuritis leads to complex user interfaces that are hard to learn and use, turning the users focus from the tasks themselves to addressing product experience problems.

Regarding this issue, Don Norman explains it in the following way "Complexity probably increases as the square of the features: double the number of features, quadruple the complexity. Provide ten times as many features, multiply the complexity by one hundred". ([2]: p.174).

Most software products' features are actually rarely used with the sum of it all becoming overwhelming to novice, intermediate and even expert users, especially those who execute basic tasks most of the time and contributing for an increased level of frustration and anxiety.

In order to address this problem, several attempts have been made in creating software that offers minimal features and clean interfaces. These attempts have been mostly successful and many new products are following this approach. However, an important challenge remains regarding how to employ this minimalistic approach while still providing a powerful tool with complex features set. This is the main research question that we face.

The current paper intersects Software Engineering and Human-Computer Interaction by illustrating the advantages of software product design through a minimalistic approach based in the concept of "What You Get is What You Need" (WYGIWYN). By offering users a minimal set of needed tools, software lets users really focus on their tasks, allowing them to really make use of the tool in order to reach their goals in a seamlessly way. This is an important question to address since there is a dichotomy between software usability and its usefulness in terms of provided functions. It is easy to reduce complexity by cutting-off features but it is not as simple as it might sound to define and reach the right balance between these two needs.

Our approach is based on the premise that a good user experience derives from minimalistic interfaces while still offering powerful features and only showing up the required tools and materials when the users' tasks really demand it.

The remaining of this paper is structured as follow: Section II briefly describes related work regarding minimalistic design interfaces. Section III presents Delineato Pro, the Mac OS X tool that was designed with our WYGIWYN approach. Section IV presents several evaluations performed to verify that (a) the application is in fact "distraction-free", (b) minimalistic UI leads to an increased performance with lower error rates and (c) in real world industrial context there has been an acceptance of the potential of this tool.

II. Related Work

Software systems should deliver the right functionalities while still offering the right operational and development qualities [2]. This goal is in fact quite hard to achieve and as Buschmann notes "when architects have a dominating preference for functional coverage or an excessive bias towards performance tuning and adding variability points, projects rarely have a chance to succeed on time and budget" [2].

Kim and Bae make a very interesting software construction proposal [3] in which aligning the dependencies among software parts in one direction so that they are allocated to maintainers based on their experience level. They decompose the software into parts based on functionality and order the parts by their essentiality, which indicated how difficult it is to change each part. They have applied this approach to a military application and found that the constructed software enables them to confine maintainers' activity within a limited working area, making it safer against maintainers'

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modifications [3].

This approach is similar to ours since with Delineato Pro we only show up the tools that are needed for that *time* necessary to complete that *particular task* the user is working on.

III. Delineato Pro

A. Design Approach

Most diagramming tools, even those who were developed with a mindset for minimalistic interfaces, offer the user with a pre-defined paper size (e.g. A4 or US Letter). As you can see by this short example, the minimalistic design approach is insufficient by itself in order to solve certain aspects.

By removing features and creating minimalistic interfaces, developers create boundaries and limits that inhibit the real final purpose of the tools and restrain users' creativity while inhibiting the essence of diagramming activities. In Delineato Pro, the user is presented with an unlimited canvas size that grows as the user *needs* it to grow (see Fig. 1).

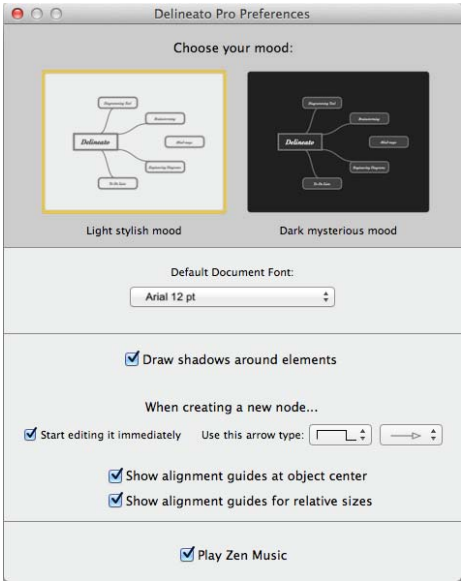

Fig. 1 Delineato's Preferences Window

The design approach focused mainly on three goals:

- Keep it **simple**: the design should make simple, common tasks easy to do, communicating clearly in the user's own language and providing good shortcuts that are meaningfully related to longer procedures (e.g. keyboard shortcuts to quickly create new nodes);
- The design should also keep all needed options and materials for a given task **visible without distracting** the user with extraneous or redundant information. Good designs don't overwhelm users with too many alternatives or confuse them with unneeded information; instead provide the user with the tools he needs, but only at the time he needs them;
- Make it ***zen***! This implies a clutter-free interface that stimulates the creativity and productivity by offering a zen/calm interface.

With these goals in mind, the team crafted a tool that really helps users focus on their activities and tasks rather than wasting time exploring and solving user interface issues. However, the application needed to be powerful enough to include in a clever way all the necessary and desired features. This translated in a challenge that required several iterations and user testing following a heuristic process.

B. The User Interface

Delineato's Pro user interface was designed in order to exploit the simple clean power of a blank sheet of paper in the increase of concentration levels. Traditionally paper and pencil are powerful brainstorming tools and brainstorming requires diagramming.

When the user opens the tool for the first time, the first thing he notices is the clean canvas displaying only a brief (less than two seconds) welcome text note that states the infinite canvas size and basic commands.

The canvas itself is dark gray but it is easily changeable to light gray through the Preferences window, as illustrated in Fig. 1 and it can also be changed by applying any of the available themes (e.g. blueprint theme changes the canvas to light blue and the objects, shapes and lines to solid white). The design idea behind this was to maintain a soft ambient light so that users won't feel tired trough while working on their tasks. Informal usability tests (see Section IV), have shown that a significative percentage of users (57.9%) reported the white background (traditionally used in most tools) as "too aggressive" and "headache-maker" and it was deprecated for the light grey (44.3%) or dark grey (55.7%) instead.

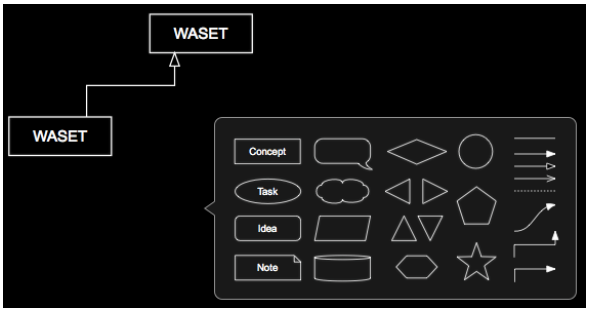

Fig. 2 Delineato's Dark Gray Mode helps users to focus

Another major feature was the addition of ambient music. As interesting as it might sound, the addition of a looped meditation music revealed to be a popular feature with a stunning 89.3% of users reporting that they didn't turned off the music during their work and a staggering 73.1% claiming that it really helped them "focus". This could only be achieved after the developers' team found what was considered by users' as the "perfect" music.

Analyzing the user interface of Delineato Pro, one can conclude that it can't appear more minimalistic than it is. This is especially valid in full-screen mode. There are no palettes

shown by default, and there are no visual references. Tools palettes can be called by keyboard shortcut 'p' or by right-clicking anywhere in the canvas. Usage is direct drag and drop style of elements with the palette automatically disappearing as soon as the element is dropped and the edit element palette showing up at the same time and disappearing as soon as the user clicks outside.

The design of the palettes was even customized to maintain the clean look and overall look and feel, varying according the user's preferences (again dark-gray or light-gray).

User testing showed that the drag and drop style was not highly accepted (43.7% said they preferred this style rather than the click-to-design method), however, the automatically disappearing palette feature was highly praised with 67.1% considering it helped them "focus".

In order to address concerns regarding drag and drop style, the team added another useful function: the creation of parent-child objects. When users select an element, tiny arrows in four axis appear allowing the duplication of the object and the creation of the connector automatically and making that the objects inspector isn't called as many times as in a conventional diagramming applications.

The connectors' editing inspector also follows the same philosophy. Double-click to open and click outside to make it go away. The inspector contains all the major features for a tool of this kind, and it also integrates the text features (fonts and styles).

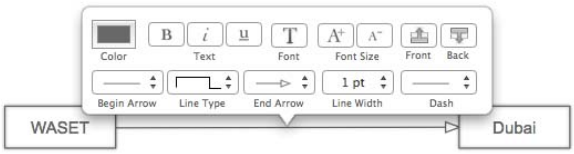

Fig. 3 Delineato's editing inspectors minimize the pointing device's travel time while keeping the UI uncluttered

Other features that were praised by users included the auto-hide top bar of MacOS X system, the keyboard shortcuts for creating nodes and overall navigation and the multitouch support for zoom.

IV. Evaluation And Real World Acceptance

In order to validate the concepts and design approach, the team conducted a formal evaluation process. We were interested in (a) assessing if the tool was indeed "distraction-free" when compared to other tools, (b) study if the minimalistic UI lead to increased performance and lower rates and (c) investigate the acceptance of the tool in real-world industrial context.

A. Performance and Error Rates

The research team identified three major groups of potential users:

a) *Developers/engineers* – used to this kind of tools and with specific needs. For example: software developers.

b) *Creative users* – without specific computer knowledge, but for a reason they want to express their ideas to base their work upon. For example web designers.

c) *Operational users* – who need to draw schematics of business or tasks processes. For instances, a project manager who wants to draw schematics of marketing processes, call center reply maps, etc.

For each potential user group, a scenario was written along with six related tasks to be followed during the tests. Each different scenario was intended to simulate real-world problems to be solved by the tool. All scenarios had similar tasks. At the end of the tests, ten questions were included, to capture participants' opinions about their experience. No time limit was given to the participants to accomplish the tasks, but for each task, time was recorded as well as the computer screen.

Participants were introduced to the two researchers who would assist them during the tests. One of the researchers acted as the test observer, timing each task completion and observing the participant's behavior and body language. The other researcher acted as a secondary observer, taking notes of comments, ideas and opinions made by the participants, and also strategies taken by him while accomplishing the tasks. These notes were to be correlated with the answers given by the participants as well as the results of the tasks. Participants were briefed by filling a small survey before taking the test, to determine their experience level in the use of this kind of tools.

At the beginning of the tests, it was told to each participant that the tool was being evaluated, not them. This made them more comfortable during the process. Post-tasks questions were given to each participant and included questions about their experience as well as recommendations and opinions about the Delineato Pro tool.

Most participants had success accomplishing the tasks given. Only the first task took them the most time to complete, but less time for the developers/engineers type of users, due to their experience in using other tools of this kind. Users took an average of 18 seconds to find the set of items to draw at the first task, but participants with most experience level took an average of 12 seconds. This could indicate a problem, not being able to find the drawing tools, but the following tasks proved that they were faster-accomplishing tasks as they learned how to get the drawing items.

Most participants found Delineato Pro comfortable to use because of the lack of buttons cluttering the interface. The needed tools were always at the precise location, near where they intended to draw something in the canvas space, at a distance of a mouse click.

The majority of participants managed to draw the diagrams asked in the scenarios, but for the same scenario they draw them slightly differently, because the tool does not impose the use of specific shapes to represent concepts. There were only two users with problems accomplishing the first task faster than the others. One because he did not find the specific shape, which he was used to use in other tools of this kind, to represent the concept he wanted. The other user had problems

due to indecisions on which shapes to use for modeling what it was asked. Also, the latter user also had difficulty in understanding what it was asked in the tasks given, and his answers indicated that he had basic experience level in the use of this kind of tool.

One other step that took most time at the first task was the insertion of shapes' texts. It was asked to give names to the shapes. The average time taken was 15 seconds, having one case where a user took 32 seconds to find a way of inserting the text in one shape.

Participants seemed to be comfortable with Delineato Pro after accomplishing each task. Most of them displayed some tension at the beginning of their tests, but as they explored Delineato and finished the first two tasks, they felt more relaxed. It was asked, at one of the last tasks, to represent an idea to document an action or concept. They were entirely free to accomplish this task, and they had to use their imagination to make it so. At this point, most of the participants knew already the tool, and they easily managed to express their imagination and creativity.

B. Comparing Tools

One of the goals of our "What You Get Is What You Need" approach was to provide a tool that was capable of delivering functionality at a high level without compromising the minimalistic design that avoid users being distracted. Therefore, we started our evaluation by measuring the subjective parameter of distraction against a baseline. That baseline was the famous OmniGraflle software.

This involved two groups of 10 users each, with one using Delineato Pro and other using OmniGraffle in a between-subjects design. A time limit of 10 minutes was given to each user, and they were asked to brainstorm a feature list for writing application.

After the 10 minutes session, users were asked to fill in a questionnaire that focused on the perception of distractions levels users had.

C. Technology Acceptance in Real World Industry

The Technology Acceptance Model (TAM) developed by Davis and his peers [4] is a widely used theoretical model in the Management Information Systems (MIS) field. The idea behind it is to attempt to predict and explain computer usage behavior, offering both researchers and practitioners a direct, pragmatic instrument to measure the acceptance degree of a given technology.

In order to obtain insight if Delineato Pro would be adopted by professional users, we firstly evaluated the tool under the framework of the TAM model, in two different companies and with a total of seven software engineers and designers. A qualitative study was conducted around the tool to get some insight about usefulness and usage. All subjects had strong experience with diagramming and modeling tools.

After a two-month period with the tool, subjects were asked to answer a 10 questions survey based on perceived ease of use, perceived usefulness and attitude toward using or not the tool. Items used were formulated through a 7-point Likert scale, where the order of presentation was randomized and questions negated to avoid monotonous responses as shown in Table I.

TABLE I
SURVEY CONSTRUCTS

Construct	Questions
Perceived Ease of Use (PEOU)	1. Learning to use the tool would be easy to me.
	2. It is easy to create diagrams using this tool.
	3. It would be easy for me to become skillful at using this tool.
	4. I would find this tool easy to use.
Perceived Usefulness (PU)	1. Using the tool would improve my performance in creating diagrams.
	2. Using the tool would help me present my diagrams in a better way.
	3. Using the tool would enhance my effectiveness in creating diagrams.
	4. I would find the tool useful in my company.
Attitude toward using (A)	1. Using the tool is a good idea.
	2. I like the idea of adopting this tool.

Results are shown in Table II. These results (all averages are well above the 3.5 neutral values in our scale) mean we empirically corroborate that participants find Delineato both useful and usable, show a positive attitude towards this tool, and they intend to use the tool in a near future. From observations, we also concluded that the tool had a relevant role in facilitating communication with other users, although this aspect deserves more research effort to understand better how this communication could be enhanced.

TABLE II
DESCRIPTIVE STATISTICS FOR THE CONSTRUCTS

Statistics (*N*=8)	PEOU	PU	A
Minimum	6	3	3
Maximum	7	7	7
Mean	6.25	5.85	5.5
Standard Deviation	0.75	1.12	1.16
Cronbach's Alpha	0.89	0.81	0.87

Finally, a first public version was released in the Mac App Store to evaluate the acceptance by end professional users.

The results were remarkable with Delineato Pro being downloaded by more than 7,000 users of all around the world and with the tool topping the productivity applications charts.

User reviews were also very positive with the rating conquering a solid 4 out of 5. The popularity of the Delineato Pro was such that Apple Inc. decided to give it front page visibility during a couple of weeks in all stores in the "New and Noteworthy Section".

Specialized media also gave the tool a lot of visibility, MacFormat UK magazine stated "there are more powerful mind-mapping tools out there but not many this stylish (…) clean, crisp diagramming (…) efficient keyboard shortcuts" [5], Mac World magazine and tech blog claiming "Delineato

Pro is a wonderfully minimal app (…) with an awesome future" [6]. Other reviews praised Delineato and its clutter-free interface.

Overall, reviewers seem to have adopted quite happily and quickly the What You Get is What You Need concept that Delineato Pro offers and this indicates to fellow researchers and developers that this might be the way to follow in software design for the upcoming years.

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