Abstract

This research review information acquisition and analysis processes in both marketing and education literature and will empirically test the applicability of the VAK (visuals, auditory, kinesthetic/tactile) perceptual learning styles model to customize online info presentation format. This is performed by studying the effect of matching distinct online presentation formats with consumers’ learning style on communication efficiency and purchasing decision. A 3(visual-rich, auditory-rich, and interactive/simulation-rich for online presentation format)X 3(visuals, auditory, kinesthetic/tactile for consumer’s learning style) experiment is under development. While the purpose of experiment is to test for presentation format and learning style congruency effect on communication efficiency and purchasing decision and present a reliable scale for consumer perceptual learning styles, it would also reveal a potential superiority of one format for the general population, i.e. indifferent learning style, and enable to verify specific response patterns, i.e. for individuals with two prevalent learning styles, for kinesthetic/tactile individuals. Communication efficiency will be measured by memory recall and website assessment; purchasing decision is reflected by product evaluation time, perceived purchase risk and intention to buy. Different product categories with different complexity and tangibility levels are included at the simulated site to reduce product-characteristics effect and allow for generalizability of findings.

Research in mass customization and personalization has so far stressed production and technology aspects of the process. While some studies have showed how customizing item locations at a certain media, i.e. customized email, based on consumers’ observed behaviour or preferences can enhance communication efficiency or productivity (Ansari, 2003), other research in online behaviour have concentrated on modeling and predicting online consumer and shopping behavior (Montgomery, Srinivasan, Li and Liechty, 2004; Sismeiro and Bucklin, 2004; Kalczyński, Senecal, and Nantel, 2006), showing that models could be useful in predicting behavior based on current status, demographics, visit sequence and clickstream. Consumer research has shown that differences in consumers predict where and how a consumer chooses to shop and be motivated to behave in a certain way (Roth, 1997). Internet technology has been advancing rapidly making it possible to provide a personalized webpage, in both content and format, for each
customer. Nevertheless, the question of how initial consumer’s abilities and preferences in acquiring and processing information could be used as an input to customize information presentation format and if such customization can be independently and empirically justified is yet to be answered. The latter is the main topic of our research and will be briefly discussed through this extended abstract.

When engaged in information search online, consumers could be considered to be in a process of learning. Available theories in learning styles have so far been widely intact by both academics and practitioners. On the other hand, consumer research furnish different, inconclusive results about the relationship between consumer’s abilities or preferences on one side with information format on the other side and the impact of such relationship on product purchase and brand choice (Richardson, 1978; Hampson & Morris, 1979; Henry, 1980; Childers & Houston, 1984; Peck & Childers, 2003). Websites and web portals designers would follow a multiple info presentation format strategy to match format with consumer learning style if empirical evidence showed learning style and presentation format congruency to enhance communication efficiency and to facilitate purchasing decision.

Providing an empirical test to the effect of the VAK (visual, auditory, kinaesthetic) perceptual learning styles (Dunn & Dunn, 1984) interaction with presentation format on communication efficiency and purchasing decision, this paper proposes that researching customer’s learning style might be a potential substitute to studying the abilities-preferences interaction and would, therefore, be a potential customization method to enhance communication efficiency and purchasing decision. The paper also examines the potential superiority of a certain format, i.e. visual-rich, auditory-rich, or interactive/simulated-rich, for the general population. The rest of this paper is divided in the following (a) a synthesis of literature of both consumer info search and processing and individual learning styles, (b) authors’ hypothesis development, (c) methodology, (d) and a brief discussion of potential research and managerial implications.

**Literature Review**

*Consumer Behaviour Literature:*

Literature shows the importance of senses in info acquisition and processing. Research on individual differences in information processing has multiple implications on consumer applications. The effect of individual abilities on brand choice accuracy was found to be higher than that of the increment in purchase information complexity (Henry, 1980). Distinguishing between coding ability and coding preference among individuals, Richardson (1978) found information presentation format, specifically visual versus verbal, and memory recall to significantly relate to coding preference rather than ability. This indicates the heterogeneity among individuals not only in ability to process information but in preferring one presentation, or information coding format, over another.

The cyclical processing model (Hampson & Morris, 1979) assumed interdependence between schematic and imaginal processing. Ability to process information, however, was sometimes found inadequate to explain between-groups variance (Bettman & Kakkar, 1977). On the other hand, efficiency in
consumer information systems would be attained by understanding how presentation format interacts with individual preferences (Capon & Lutz, 1979). Both information content and format offered online could be hypothesised to affect consumer behaviour; this is because content and format is among few things a consumer can perceive of a website (Figure 1). The previous highlights the importance of studying preferred presentation, or coding, format and processing strategy at consumers’ information decoding, or acquisition, recall and analysis.

Childers and Houston (1984) indicated picture superiority in both immediate and delayed recall tasks when processing is directed at appearance features; verbal-only stimuli were recalled equally only in immediate recall when processing is directed at the semantic content in advertisements. Peck and Childers (2003) argued that the inability to touch the product inhibits the use of haptic information and might reduce confidence and increase frustration only for consumers that are motivated to touch the product. The study also suggested detailed written descriptions and visual depictions of products to partially compensate for such loss. Notably, the study differentiated among participants based on only one dimension captured by the developed measure, or the individual difference in motivation to acquire haptic information, named the NFT scale.

![Figure 1. Consumer interface communicates information and link website to a consumer](Readapted from Trauth and Cole, 1992, p. 42)

Decision makers perform more effectively with decision support aids that match their particular psychological styles (Mason & Mitroff, 1973). Benbasat & Dexter (1986) tested the effect of three information presentations (a) text in tabular format, (b) graphical, and (c) a mix of the previous two formats under different time limits. While format (a) led to better decision making and format (b) to quicker decision making when time limits were low, the mix format was found superior in terms of performance and was rated extremely high by decision makers. The same study found color to improve decision making particularly when time limitations were relaxed. Reflecting individual characteristics’ impact on format effectiveness, the study found color to improve graphs comprehension only for individuals that have a
 perceptual difficulty in disembedding a complex figure’s parts; the same researchers also showed in a previous research (Benbasat & Dexter, 1982) the number of input parameters and output variables to increase the difficulty to use decision aid only for low analytics. On the other hand, message framing enhanced message effectiveness for only individuals with prior experience (Chang, 2007); product specific characteristics, particularly functions and perceived risk, were found to moderate message framing and its effectiveness.

Johnson et al (2003) indicated the importance of learning online and successfully presented the power law of practice indicating that learning occur at initial visits and exponentially decreased thereafter and that consumers with the fastest learning curves, i.e. quickly learn and get accustomed to a certain site, showed both higher loyalty and higher purchase rates. Cues multiplicity and personalization of communicated message result in a richer media (Dennis & Valacich, 1999). Notably, research in consumer behavior both lacks a precise definition of a rich media and a conceptualization of effect of individual abilities and preferences on communication efficiency and purchasing decision. Research contained separate studies that have discussed only one or two preferences and failed to reach a consensus of preferences link with abilities or preferences/abilities link with message efficiency and outcome. An early review of literature also reflected no consensus in cognitive styles’ research and questioned the suitability of a paper and pencil cognitive style questionnaire as a base for MIS design (Huber & Robey, 1983). In addition, no research has tested the interaction of presentation formats with a global categorization, such as consumer’s learning styles, or stated preference to acquire information and its effect on online communication efficiency and purchasing decision.

Learning and Education Literature:

Available literature in individual learning styles need exploration by consumer behaviour and advertisement academics. As a start, Thorndike’s laws of learning (Thorndike, 1932) seem to have various applications at online research. The need of validation and empirical support, however, does exist for each and for the interaction of a group of these laws before examining their research and managerial implications. The following summarizes these laws, links them to existing consumer and online research and hints for potential research prospects:

(1) The law of readiness. Individuals learn best when they are ready to learn. Highlighting the effect of motivation in websites efficiency, certain contents and cues alignment might affect individual or motivate them to increase visit duration or intention to revisit. Keeping an adequate level of challenge at the website has been found to improve interactivity and drove individuals away from an apathy or boredom status (Agarwal & Karahanna, 2000).

(2) The law of exercise. Things most often repeated are best remembered. Repetition could be achieved by revisiting the website or communicating the same message in different formats or channels, i.e. email, popup, html text, or offline media, and might ultimately increase memory recall and loyalty. There is almost a consensus in offline and online advertisement as well as learning research on the positive impact
of repetition on memory. Repetition or number of ad exposure and number of website pages visited was positively related to a repeat purchase (Manchanda et al, 2006); interestingly, the same research pointed a negative effect of continuous changes in message creative, or format, on repurchasing. Another indication of the law of exercise is the importance of engaging and involving consumers in the learning process; the flow state (Mathwick & Rigdon, 2004) could be said to tie strongly with this law.

(3) The law of effect. Learning is strengthened when accompanied by a pleasant or satisfying feeling. Humour and positive emotions in ads and message presentation were related to both attitude toward ad and attitude toward brand (Zhang & Zinkhan, 2006). Another study showed message humour to be moderated by individual characteristics (Moses, Altsech, & Kellaris, 2003). Moreover, ad style and context congruency had different effect on both memory recall and attitude toward ad, depending on individual’s general level of involvement (Pelsmacker, Geuens, & Anckaert, 2002). Generally, feeling in harmony with the website would drive positive effect. Wirtz, Mattila, and Tan (2007) further theorize about arousal congruency “affective expectations, which reflect people's expectations about how they expect to feel in a given situation, might be equally important in influencing customer responses in a service setting”(p.6).

(4) The law of primacy. Primacy, or the state of being first, often creates a lasting impression. Therefore, the first website in a category a customer visit might obtain both a competitive advantage and higher chance to be revisited. Johnson et al (2003) indicated initial sites visited and learned to receive more future visits and acquire higher customer loyalty. Newell and Rosenbloom (1981) found that individuals acquire skills quickly at first but later skills improvements cost much more efforts. One can accordingly argue that message content and format must be optimal and adequate the first time because correcting errors would be difficult. More research of course is needed to investigate the effect of primacy online.

(5) The law of intensity. An exciting, challenging, and vivid learning experience teaches more than a routine or boring experience. Linking fun and individual playfulness to website efficiency, Agarwal and Karahanna (2000) and Mathwick and Rigdon (2004) work are in favour of this law. Challenge and enjoyment were hypothesised to have a formative role on attention, learning and attitude toward site (Childers et al, 2001; Novak, Hoffman, & Yung, 2000).

(6) The law of recency. When controlling for other variables, the thing most recently learned is best remembered. One of this law’s applications to online research is studying the effect of website content and format periodical update on memory. The effect of new or updated message on previous messages communicated has not been determined. The role of this law could also be investigated in the field of media convergence where studying the effect of a recent message communicated via one medium, i.e. email on a previous message communicated via another medium such as TV would help explain how memory functions with regard to different or similar messages.

Stating that an individual has a set of intelligences or abilities, Gardner’s multiple intelligence theory called researchers to investigate different abilities at individuals rather than testing behaviour or score on a single ability (Oliver, 1997). The theory classified abilities under various categories: visual or picture abilities, linguistic or semantic ability, kinaesthetic or touch and body ability, logical or number
abilities, interpersonal or people ability, intrapersonal or self ability, musical or rhythm ability. This theory has its critique and due to its various categories, it can not be easily applied to consumer research and applications. Arguably, previous categories can be regrouped under three main wider categories: visual, verbal and kinaesthetic, which implicitly support the VAK learning model discussed later and adopted in this paper.

Following Carl Jung's theories in his work Psychological Types (Jung, 1971), Myers-Briggs Type Indicator (MBTI) is a personality test designed to identify significant personal preferences. Major dichotomies (extraversion/introversion, sensing/intuition, thinking/feeling, judging/perceiving) provide insight into personal disposition to acquire and process information. Although it received criticism at both its base theory and validity (Hunsley & Wood, 2004; McCrae & Costa, 1989), Jung's theory has been applied to investigate various research questions. LaBarbera, Weingard, and Yorkston (1998) investigated and empirically found a superiority of the fit between personality types, more specifically the sensing and intuiting types, with ad image and concluded that personality types would serve as a classification system for visual imagery, especially with Internet advancement.

On their part, and adopting two of the MBTI three dimensions and the notion of product information richness, Jahng, Jain, and Ramamurthy (2002) provided a statistical examination to the interaction of information richness, or static versus multimedia-enabled picture as in performed experiment, with the two retained dimensions on purchase behaviour. In that study, multimedia-enabled picture was found to significantly and favourably influence online purchase behaviour in general. Richness had a significant effect on the intuitive types and feeling types consumers; however, no significant difference was supported for the sensing types and thinking types. Supporting a relationship between effectiveness of product presentation format and consumer's personality types, the authors called to research other personal characteristics and preferences' effect on consumer interface and predicted e-business interface design to become automatically adaptive and customizable in both content and format to each customer in the future.

Different individuals exhibit different learning styles. Choosing a learning or communication approach that would result in higher recall level is becoming a usual practise at an increasing number of institutions (Casison & Alonzo, 2000). Reviewing major learning styles theories, this paper argue the superiority of the VAK model and its adequacy to online applications and adapt it for its methodology section.

The VAK Learning Styles Model

Perceptual learning styles were found to distinctively relate to three psychological factors and human senses. Perceptual learning styles, the physical modality dimension in the Dunn & Dunn (1984) model, is recognized and applied in youth and adult learning in different countries and institutions and could be related to representational systems and neuro-linguistic programming (Dilts et al.,1980; Dilts and Judith, 2000). About 180 articles in scholarly, peer-reviewed journals investigated or used the model. The basic idea behind the model is that while most individuals do perceive and learn, instructional
environments and approaches respond more or less effectively to different individuals’ learning style and affect both outcome and attitude. While a non-peer-review (Coffield et al, 2004) declared that this and other learning style theory need to be validated or investigated, research has pointed out statistically better results when college students' perceptual preferences were identified and used (Clark-Thayer, 1987; Mickler & Zippert, 1997). Similarly, in a corporate training environment, adults had significantly better achievement and attitude when perceptual preferences were matched with training session methods (Ingham, 1991).

A recent meta-analysis research supported the model validity (Lovelace, 2005), noting the improvement in academic achievement and attitude toward learning when learning styles were matched with teaching methods and instructional materials. Reconciling the ability-preference dichotomy found in consumer literature, perceptual learning preferences correspond to abilities or strengths (Dunn, 1988). This could also be justified by the fact that an individual would be motivated to utilize the ability that would lead to easier info acquisition, or encoding; overtime, this behaviour lead to improve chosen ability(s) and decrease its associated use cost. While the initial model suggests four learning styles, kinesthetic and tactile are considered one for the purpose of this study. This is because the similarity observed between both categories, the low internal consistency encountered in research for the tactile subscale (Coffield et al, 2004), and similar indications for online applications. This research, hence, provide further evidence and examine if learning style-presentation format congruency, or fit, affect communication efficiency and decision making from a consumer perspective. The VAK model is rather simple with potential applicability in marketing and online research; moreover, it could be directly linked to presentation format. On the other hand, Gardner’s or Kolb’s model (Kolb, 1981) might apply to information content and decision processing. Following is a brief discussion of each of the three VAK’s perceptual learning styles. This paper argues that perceptual or cognitive styles will affect communication efficiency and purchasing decision, rather than navigational and search patterns. Calcaterra et al (2005), for example, found no support for a relation between cognitive style and search patterns because personal experience deemed to play a much determinant role in explaining navigation behaviour. Cognitive styles link with performance in a web environment findings are inconclusive and more research is needed in that field (Calcaterra et al. 2005; Ford & Chen, 2000).

**Visual:**

Visuals learn best by seeing images and shapes, have vivid imagination, and are quiet by nature. They find difficulty to interpret instructions communicated verbally and prefer to acquire info using their eyes; they translate the info acquired by hearing or reading as a picture into their minds. Therefore, it would cost this segment less to store and recall visual-rich messages than audio-rich messages. Audio accompanying a message would hinder visuals comprehension. When it is the time to recall a piece of information, visuals would first recall the image they had formed in their minds; these individuals usually use the terms ‘I see what you mean; I have a clear picture about the situation’ and so on (Dunn et al, 1984). Individuals described as visual learners are said to perform better in an environment rich in images as well
as text; this is because these individuals find it easier to convert black-and-white text into pictures and they can be stimulated if asked to form pictures about the information received or to solve a problem, i.e. form a decision. Therefore, communicating info to this segment would be optimized by increasing visual cues, text images and charts. Since this segment can be physically aroused by bright, changing colors and high definition pictures, their attitude towards site would be enhanced by applying a visual-rich format. To help visuals form a purchase decision, more product visuals’ aid could be communicated and a text-chatting with another customer or a salesperson option could be provided.

Auditory:

Auditory individuals prefer to use their ears, enjoy talking and listening, have an outgoing personality in general and find difficulty interpreting written or visual-rich instructions. To fully understand, these individuals should hear, listen to an explanation, or self-read the text (Dunn et al, 1984). Unlike the previous segment, these individuals do not depend on forming pictures but filter received info through listening. Auditory individuals usually use the term ‘I hear you, I am listening, that sounds right’ and so on; in a classroom, they can easily repeat what the teacher says, can be described as the most talkative, and face more challenge in writing correctly (Kanar, 1995). These individuals can be stimulated by rhythms, poem and music. This segment comprehension can improve by increasing auditory content and cues, offering the option to listen, rather than to read, to a product review and specification, allowing them to hear other customers’ feedback or comments. Interactive video might not be the best alternative for auditory because of richness in visual cues which might increase distraction and reduce efficiency by filling limited memory space. Because auditory individuals are better at solving problems by discussion, forming purchase decision can be enhanced by allowing verbal interaction, i.e. audio discussion of product characteristics at chat rooms, getting online voice help. Increasing interactivity to this segment can be reached by games that contain or engage people in forming lyrics, music, or rhythms. A music background would improve comprehension; other auditory cues would enhance attitude as well.

Kinesthetic/tactile/feeling:

Kinesthetic or Tactile individuals favour the tactile and feeling sense to acquire information. Poor at listening skill, these individuals learn easily by doing and expressing emotions; they learn by hands-on activities, by watching someone else doing the task, and by applying a certain task. For kinaesthetic, touching or feeling help them understand and hands-on activities form an optimal learning method; such activities leads to both processing and recalling the information quite well (Kanar, 1995). Engaging feelings into learning, kinesthetics do not have internal pictures of neatness and organization in mind as that of visuals and usually they use the terms ‘I feel, I’d like to get a better handle on it’. On the other hand, these individuals are less organized and lack a sense of time. Managing an online presentation format that appeal to and compensate for lack of suitable information for kinesthetic consumers might not appear an easy task. On the extreme, they might be offered to try the product for a brief period of time with the possibility to return it or they might be given the option to receive a small sample, a prototype, or a piece of the product (i.e. a piece of cloth of a sweater). Online, these consumers should have the option to interact
and get involved with the product, i.e. move it around and view it from different angles, assemble or adjust a simulation product, or review an interactive video of another person assembling or using it. Detailed info about the size of the product, its colors, smell, weight and touch might as well help compensate for these individuals’ learning style fit.

Allowing these consumers to engage in live activities with other consumers, to interact with a salesperson, and express feelings and concerns about the product would theoretically fill a gap between preferred learning style and the online medium. Work should be done to investigate how this segment could be offered the chance to engage in hands-on involvement with the product or interaction with other customers and the effect on perception, attitude and perceived risk. Additionally, kinesthetics might be approached online by offering the option to build-up or customize the product because such activities are congruent with their learning style. Video-simulation, real size images and more info about physical product characteristics should improve their comprehension and purchasing attitude. Research showed that format modifications can compensate for individual differences in perceptions and abilities to process information. A good example is Benbasat and Dexter (1986) study where color was found to significantly increase graph comprehension for individuals with difficulties disembedding a complex figure’s parts. According to this model, previous individuals can not be described as visuals and might be kinesthetics. Peck & Childers (2003) suggested detailed written descriptions and visual depictions of products to partially compensate for information loss for consumer motivated to touch the product. A summary of major group’s preferences in acquiring and processing information is included in Table 1.

<table>
<thead>
<tr>
<th>Modality Preference</th>
<th>Visual</th>
<th>Auditory</th>
<th>kinesthetics/tactile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>Reading</td>
<td>Listening</td>
<td>Hands and body use and movement</td>
</tr>
<tr>
<td>Observing</td>
<td>Observing</td>
<td>Lecture</td>
<td>Total involvement in task</td>
</tr>
<tr>
<td>Diagrams, complicated graphs</td>
<td>Diagrams, complicated graphs</td>
<td>Discussion</td>
<td>Designing and adjustment</td>
</tr>
<tr>
<td>Pictures</td>
<td>Pictures</td>
<td>Recording</td>
<td>Playing and affection</td>
</tr>
</tbody>
</table>

Table 1. Visual, Auditory, kinesthetics/tactile different preferences (readapted from Coffield et al, 2004).

Hypotheses Development

The theory of cognitive fit indicates that an effective info representation results in a better problem solving performance at less time and that the most effective presentation format is the one that best fit a consumer’s cognitive and learning style. The theory considers cognitive fit to occur when problem solving elements, such as task, presentation, skills and tools, achieve consistent mental representation or when a representation congruence between external information format and consumer internal representation prevail; Chandra & Krovi (1999) has discussed and extended this theory to external information and found
a favourable effect of an object-oriented. Human attention is said to be of limited capacity and should be allocated in varying amounts to different locations in the visual field; Janiszewski (1998) proposed and defined the competition-for-attention theory. This theory views multiple objects on a screen as potential candidates that are competing for attention and that attention competition affects both efficiency of information processing and purchase. Info Search cost has been identified to have two components: (a) physical costs or the time to find information needed to make a decision and (b) cognitive costs or costs of decoding and realizing info, i.e. making sense of information gathered and analysing it. The Internet has shifted the relative importance of these components by minimizing the physical costs; sites offering lower cognitive costs and customization would create cognitive “lock-In” for consumers overtime (Johnson et al, 2003). Based on previous discussion, representing the info using the format associated with lowest decoding and processing cost to an individual would improve communication efficiency and optimize webpage space utilization. Moreover, according to the competition-for-attention theory, offering the three formats on one page would reduce interactivity, drive limited attention from info content, i.e. message communicated, to different elements, i.e. buttons and options, and increase the possibility to receive redundant info, i.e. voice and text evaluation, through different creative by same customer. While the previous is not the topic of this paper, it need further investigating by researchers. Our work, however, builds on previous theory and considers simplicity to be a key in website design. Taking the previous two theories with above discussion, this paper proposes that:

**Hypothesis 1:** Communication efficiency increases when a fit occur between product presentation format and consumer’s learning style, i.e. image-rich format for consumers with a prevailing visual learning style, audio-rich format increases communication efficiency for consumers with a prevailing auditory learning style, interactive and video simulation-rich format increase communication efficiency for consumers with a prevailing kinesthetic learning style.

Similar relationship is expected for purchasing decision:

**Hypothesis 2:** Purchasing decision improves when a fit occur between product presentation format and consumer’s learning style.

**Methodology Development**

A controlled laboratory experiment is being developed to test hypotheses and detect statistical effect and variables interaction. The 3(visual-rich, auditory-rich, and interactive/simulation-rich for online presentation format)X 3(visuals, auditory, kinesthetic/tactile for consumer’s learning style) experiment’s main purpose is to test for presentation format and learning style congruency effect on communication efficiency and purchasing decision and present a reliable scale for consumer perceptual learning styles and to reveal any potential superiority of one studied format for the general population, i.e. indifferent learning style, and enable to verify specific response patterns, i.e. for individuals with two prevalent learning styles,
for kinesthetic/tactile individuals. Communication efficiency will be measured by memory recall and website assessment; purchasing decision is reflected by product evaluation time, perceived purchase risk and intention to buy. While memory indicates efficient communication, it indirectly plays a role in purchasing decision. The use of competing memory inputs and use of memory versus contextual information in forming a decision were discussed by Menon et al (1995). Highlighting memory role in decision making, Menon & Raghubir (2003) verified the ease-of-retrieval hypothesis that suggests individuals to use the ease with which information comes to mind as a heuristic in forming judgments. Different product categories with different complexity and tangibility levels are included at the simulated site to reduce product-characteristics effect and allow for generalizability of findings.

Product categories chosen are: picture frames, compact-sized mp3 player, and vacation at a south destination. For each product category, the site contained three different products variety, i.e. three different brands with minor differences for the mp3 player, three different south destinations with different ratings. Price manipulation is minimal to shift attention to other characteristics. To minimize method effect, the different working platforms, i.e. visual-rich, auditory-rich, and interactive/simulation-rich, share the following criteria:

- Simple design to reduce creative effect.
- Basic page layout, such that one can find in a typical shopping website.
- Minimum number of elements per page to drive concentration to embedded elements.
- Same navigation options, i.e. buttons and navigation diagram.
- A 2D small-sized coloured picture of the product of 300 ppi resolution.
- Small paragraph about the product main characteristics and functions.
- A section of product review by other customers (4-5 reviews per product).
- A bar tool indicate a more positive or more negative overall score by previous customers
- A credit certification symbol that indicate site security when making online transactions.
- Same background color, i.e. white.

While manipulation is performed to info format of product specifications and customers review, information content is controlled to be as identical as possible. For the visual-rich or format 1, clicking the ‘Click for more’ button results in a two 3D fixed picture of the product taken from two different angles and more info about the product in a text format. Product review for this format is offered in a text format. For the auditory-rich format, clicking the ‘Click for more’ button results in the same first 2D small-sized picture and a direct play for a registration of product specifications by a human voice, reading the same info provided in format 1. Product review for this format is offered in an audio format, i.e. previous customers review registered as if coming from customers. For the third format, clicking the ‘Click for more’ button results in a simulated video executed by Flash that include both un audio play for product specifications, i.e. same as in auditory-rich format, and a person holding or using the product and showing it from different angle. No additional fixed photo for product is showed. Product review for the third format is offered in
text; next to the text an animated face is provided to reflect how happy or angry the customer was when trying the product. The info presented by the text, is identical in the three formats.

A pre-test on a convenience sample of 50 individual purposes is to verify the reliability of perceptual learning style questionnaire and adapt it to consumer research application. This pre-test defines items adequacy, refine items with low consistency on supposed dimension, and help predict population distribution in terms of the three learning styles to plan for experiment. Taking individuals distribution by learning style into consideration, a priori experiment planning indicates the size of each group deemed to result in a significance difference of at least 80% power, which correspond to 20% type-I error, is 34. The total sample needed is then 306 individual. Qualified participants should report using the internet previously to buy products and will be randomly assigned to one of the three formats. Distribution is to be performed after filling a questionnaire that contains the adapted 40 items from the learning style inventory (LSI) to insure enough and comparable presence of each learning style in each of the resulting nine groups.

After performing a warm up task, an administrator will ask participants to consider that they are considering buying a product, i.e. ‘in the market’, for each of these products. The administrator will explicitly ask participants to click all the available buttons on screen about the nine products available at the site and to thoroughly review the information of each product and then to add one product of each category to shopping cart. The administrator will inform participants to become familiar with the information presented as they will be asked about it later on. The administrator will also inform participants that 30 minutes, i.e. slightly more than three minutes per product, is available to complete the task; however, those who finish before time can close the site and stay seated. Product evaluation or processing time is calculated as the difference between the time participant open the site and the time he or she add the third product to shopping cart. When the assigned time finish, the administrator will ask participants to finish the task and close the site. A questionnaire containing items to measure memory recall, i.e for product brand names and few major specifications, perceived risk to purchase using the site and for each product category, and intention to buy using the site. Clickstream will be automatically recorded using special software for potential analysis and a personality questionnaire will be the last step performed for future analysis before thanking participants.

Analysis of result will detect for the interaction, i.e. fit or no fit, and the three formats. The analysis will also examine if any of the format yield better results in the case of indifferent learning style and will detect any interesting patterns.

Discussion

Discussion of findings with implications for managers and research will be furnished. Presenting typologies as complex theories, rather than classification systems, Doty & Glick (1994) successfully argued that typologies identify ideal types, whereas classification systems specify decisions to categories items in mutually exclusive, exhaustive sets. We go with previous authors’ conclusion because this work identifies
customers into ideal sets with ideal solutions. In real word, individuals do not fully belong to one category; some individuals exhibit, for example, strengths at more than one perceptual learning strength (Lovelace, 2005). The previous indicate the possibility to apply hybrid format solutions or give the option to customize the site layout and format according to individual preferences.

One can argue that providing a richer environment, arguably video simulation, would be adequate and yield best results for all groups. This quick result, while tempting, might underline a fallacy resulted from the fact that one’s information-rich format might not be another’s with different perceptual learning strength. For example, for a customer with auditory perceptual style, a video-stimulated format might drive attention away from message and furnish unneeded info. Additionally, according to theory-of-competition (Janiszewski, 1998), more information or option is not always better. Therefore, a certain format or multiple formats offered simultaneously would distract or reduce positive attitude for individuals with certain learning strengths. While this research is manipulating for information approach or format, it regarded the contents as fixed. Learning theories, including the VAK, suggested that both format and content manipulation would affect comprehension, memory, and attitude. This obviously is a potential research avenue.

Culture impacts group learning styles. A study found Asian adults to be significantly more auditory and visual than Caucasians and Puerto Rican adults to be highly kinesthetic, but low auditory and low visual (Dunn & Griggs, 1990). Gender might pose a difference on learning style. In a recent study, males were more than three times more likely to prefer gathering information using their senses, i.e. sensing style, than females, who preferred reacting to information with personal reflection and consideration for others, i.e. feeling style; on the other hand, twice the number of females preferred gathering information through the use of unconscious, i.e. intuition style (Gregory, 2004).

Experience might play a role in information efficiency and effectiveness. Experts and novices had different styles in perceiving and assessing information. Viewing experts to be more deeply analytics and novices to be more affected by external information, Alba & Hutchinson (1987) defined expertise dimensions and highlighted the relative importance of two of them, namely cognitive efforts and cognitive structure, on the rest dimension, analysis, elaboration, end memory. Following the same logic, Mandel & Johnson (2002) found prime, i.e. embedded background elements hinting a certain product feature in performed experiments, to affect both experts and novices and concluded, that online design fluidity and preferences present significant challenges to consumers. Reflecting a precognitive aspect, most consumers who were affected by prime in the previous study stated that prime, while recalled, did not affect their behavior or choice. Fitzsimons et al (2002) discussed that unconscious info acquisition and processing relative effect on learning and decision could be much greater than what choice research has shown so far. One can conclude, therefore, that online information format, location, and sequence affect consumers’ acquisition and apprehension of product info and hence purchasing decision at both the cognitive and precognitive levels. While this work shed more light on this topic, more research, of course, is needed to verify this in both the online and the offline fields.
References


Gregory, Davis A. (2004) The relationship between learning style and personality type of Extension Community Development Program professionals at The Ohio State University. Ohio State: The Ohio State University,186 pages


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i A scale of multiple intelligence is available online: http://pss.uvm.edu/pss162/learning_styles.html

ii Articles and other materials are available online at http://www.learningstyles.net/

iii This report offers a review for most recognized learning styles with strengths and weaknesses.