Creating and Using Personas in the Web 2.0 Digital Service Environment: An Empirical Study Based on Interview Surveys

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Abstract

As a novel approach to analyzing information seeking behavior within the Web 2.0 context, this study created and utilized personas based on a survey of 497 graduate students from the Chinese Academy of Sciences regarding their Web 2.0 experiences and subsequent follow-up interviews with 36 participants, to discuss strategies for enhancing digital services in the Web 2.0 era. The research identified four distinct persona types characterized by specific behaviors, traits, emotional responses, and service requirements.

Full Text

Creating and Using Personas in Web 2.0 Digital Service Environments—An Empirical Interview Study

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Abstract: As a novel approach to analyzing information-seeking behavior within the Web 2.0 context, this study creates and utilizes personas based on a survey of 497 graduate students and PhD candidates from the Chinese Academy of Sciences (CAS) regarding their Web 2.0 experiences, supplemented by follow-up interviews with 36 students, to explore strategies for enhancing digital services in the Web 2.0 era. The research identifies four distinct personas differentiated by their behaviors, characteristics, emotional responses, and service needs.

Keywords: information behavior, information service, information system, web user, information communication

1. Introduction

Persona research has recently been applied to describe user behaviors, characteristics, and needs. At the June 2009 IFLA conference, Dr. Edmund Balnaves, editor of the *ITS Newsletter*, identified this approach as a "new approach to analyzing information-seeking behavior in the Web 2.0 context" [1]. The Japanese National Diet Library reported on this development two days later [2]. Earlier, the September 2008 issue of *D-Lib Magazine* published Jack M. Maness et al.' s work on "Using Personas to Understand the Needs and Goals of Institutional Repository Users" [3], while domestically, "Web 2.0 Persona-Based Digital Library Interface Design" appeared in the same month [4], suggesting a concurrent discovery of persona research within library science.

However, the digital library field has seen limited application of such "social science" research to guide "engineering construction." One reason may be skepticism toward persona models for describing user behavior, which itself stems from insufficient systematic investigation, particularly mixed-methods empirical research combining quantitative and qualitative approaches.

The process of creating and using personas fundamentally involves establishing user models through interviews, surveys, or observations, then applying these models to design system functions. For instance, Bowles (2006) proposed that "user-centered design" includes: (1) defining the product; (2) defining users; (3) defining tasks; (4) defining the user interface; (5) defining functional requirements; and (6) defining non-functional requirements and constraints [5]. Adlin et al. (2007) suggested: (1) defining user groups and collecting target user data; (2) transforming collected data into a fictional user or persona; (3) humanizing the model to make it a "team member" ; (4) consulting it throughout project decision-making; and (5) using persona requirements as the basis for evaluation, including whether to reuse or discard the persona [6-7]. Antle (2008) outlined a ten-step process: (1) identifying actual goals and action patterns; (2) adjusting the design scenario framework; (3) operationalizing the framework and questions; (4) data collection (interviews, observations); (5) deriving pattern analysis from the framework; (6) synthesizing patterns to complete persona characteristics and descriptions; (7) reviewing literature and documents; (8) comparing personas and reducing numbers; (9) checking completeness; and (10) validating through use-modification cycles [8].

Based on Alan Cooper' s definition [9] and established methodologies [10-11], and drawing on recent studies, this research extends earlier questionnaire surveys [12-13] to further investigate how user behaviors, characteristics, emotional responses, and service needs can be differentiated to inform corresponding service strategies.

2. Research Design

For students willing to participate in interviews, we contacted them via email and institutional phone to obtain complete contact information (mobile phone,

office phone, email, institutional address) before formally scheduling interview times and locations. Face-to-face interviews were conducted from November 15 to November 25, 2008. A total of 36 individuals were interviewed, with each session lasting one hour.

- The sample population was drawn from users identified in the previous questionnaire survey phase, selected through purposive sampling, with data collected via one-on-one interviews and written records.
- The investigation focused on describing interviewees' behaviors and characteristics, providing in-depth interpretation of relationships among electronic bulletin boards, email, research environments, and information seeking. Individual interviews followed a uniform outline to generate detailed accounts of various user behaviors and summarize the structural mechanisms of user behavior in networked environments.
- Data processing involved checking against checklists item by item, with analysis employing data matrices and permutations of item numbers.

3. Results and Findings

Following purposive sampling and fixed interview protocols, we used MAXQDA to conduct text retrieval on the data matrix, generating "usage" and "attitude" axes to identify common factors:

- **High-usage factors:** downloading e-books, software, and teaching materials; ability to express one' s own opinions.
- **Low-usage factors:** complex user membership composition, inconvenience, more promotional than in-depth useful information, lack of time or interest to learn, irrelevant content, and network security concerns.
- **Positive-attitude factors:** helps indirectly understand how to conduct work, provides useful tips, some information or documents available for free, increases information sources, provides knowledge requiring experimental operation or safety, enables understanding of other fields, enriches extra-disciplinary foundational knowledge.
- **Negative-attitude factors:** institutional or copyright restrictions, doubts about information reliability, overly messy/unprofessional content, insufficiently attractive material, unrelated to actual research work, excessive arbitrariness/lack of accuracy, many available alternatives, and search engines being sufficient for information needs.
- **Research environment or interpersonal influences:** primarily from advisors assigning work or providing research direction, peers cooperating or competing, institutional requirements for regular reporting or cross-group collaboration, and undertaking projects from other units (e.g., hospitals, military, companies).

4. Discussion

Based on the research findings, we summarize user behaviors and structural mechanisms in the Web 2.0 digital environment through the following patterns:

4.1 Type A Pattern: The Technically-Oriented Craftsman

Similar to craftsmen, these technically-oriented users excel at experimentation, investigation, analysis, and instrument usage—skilled in the process implementation, imitation, and reproduction of scientific and engineering work. Compared to other personas, Type A shows the greatest variation in usage across five network service tools. Their primary preference appears to be for timely and rapid transmission; simplified operations and convenient queries are particularly welcomed. Unlike Type D, Type A users clearly know what information or services they need.

Interviewees' daily work and study primarily involved tasks assigned by their advisors (Interview #01, #19). Within the same research group, students competed with each other (Interview #33), yet various groups within the institute communicated and collaborated across groups (Interview #26). Most projects undertaken came from hospitals (Interview #14) and the military (Interview #29).

These users believed electronic bulletin boards could provide useful tips and e-book downloads, helping them indirectly understand how to conduct their work (Interview #17), but considered email useful only for contacting otherwise unreachable people or seniors, with no other purposes (Interview #03). They would consider obtaining library new book alerts and borrowing services if they were free (Interview #32), and believed library blogs should have professional teachers reminding them about workplace safety content, such as laboratory safety (Interview #29).

Type A users are action-oriented, prioritizing speed. Their need for rapid information transmission and research work creates high demands for service speed. If service efficiency improves, these researchers will favor and anticipate the service; if service speed fails to meet expectations, the service will quickly be forgotten or ignored by Type A users. Therefore, only by improving service efficiency and making these users aware of this speed can we enhance their attention to the service.

4.2 Type B Pattern: The Trade-Oriented Merchant

Similar to merchants, these trade-oriented users excel at collecting, organizing, translating, or directly applying information—skilled at transforming scientific and technological achievements into industrial productivity or policy reports. Compared to other personas, Type B shows the most balanced usage across five network service tools. These users are also more particular about the perfection of each service, making satisfaction an important consideration.

Interviewees received research direction from their advisors (Interview #07) but managed their own research plans and progress. They were skilled at cooperating with classmates (Interview #27) and, despite having considerable freedom, still needed to regularly report to their institute (Interview #18) on their research status and work. They actively undertook company projects from outside the institute (Interview #11).

These users believed electronic bulletin boards contained much useful information and allowed them to post their own opinions (Interview #21). They also used online book ordering, software downloads, and teaching materials (Interview #26), and considered email academic news subscriptions their third information source after journals and bibliographies (Interview #14). They supported academic blogs, believing they could help understand other fields and enrich foundational knowledge (Interview #18).

For Type B users with trade-oriented characteristics, the following service strategy should be adopted: Type B users are enthusiasts of multiple options, paying attention to and using various tools while hoping for diversified information. If multiple optional pathways can be provided for information or tools, these users will be willing to try them to match their specific needs. If options are limited or singular, they will perceive the service content as relatively scarce, lacking richness and diversity, and will turn to other service methods or supplementary content. Therefore, providing multi-angle rather than rigid feedback information will give these users a sense of "being served,"thereby drawing their attention to the service.

4.3 Type C Pattern: The Theory-Oriented Scholar

Similar to scholars, these theory-oriented users excel at theorizing, systematizing, abstracting, or mapping disciplinary development directions—skilled at transforming scientific research into popular science knowledge or theoretical doctrines. Compared to other personas, Type C shows the lowest usage of peer-to-peer transmission. Fast transmission functions may not be what these users need, and related services require no special emphasis or recommendation. Additionally, in public online spaces, discussions on electronic bulletin boards may be more welcomed by these users than personal blogs, making it easier to find such users on BBS platforms like "Science Garden."

Upon entering the institute, interviewees were assigned work by their advisors (Interview #01, #19) and individually responsible for specific literature reading and experimental operations. Relationships with peers involved considerable competition (Interview #33) for project funding or positions. Their institutes held regular discussion meetings, requiring cross-group collaboration among internal units (Interview #26). Projects assigned by advisors mainly came from other universities (Interview #09).

These users disliked using electronic bulletin boards and blogs, considering BBS to have poor user experience, overly messy content, and inconvenience (Interview

#14). They viewed blog content as irrelevant, something for people with spare time, which they lacked (Interview #16). Moreover, they didn' t understand the difference between blogs and bulletin boards and had no time or interest to learn about blogs (Interview #09, #10). They didn' t value email academic functions, believing they knew clearly what they wanted to read (Interview #02).

For Type C users with theory-oriented characteristics, the following service strategy should be adopted: Type C users are supporters of specialization and theorization. In-depth discussion of specific issues attracts their attention more than transmission speed. If service professionalism improves and provides space for discussion, it will attract Type C users. Without a specialization strategy, these users will retain the impression that service content, though abundant, is quite rough. Therefore, only by enhancing service professionalism and making these users feel that their perspectives are not just self-talk but can be understood and responded to can we effectively communicate with and serve this user group.

4.4 Type D Pattern: The Innovation-Oriented Adventurer

Similar to explorers, these innovation-oriented users excel at challenging old viewpoints, proposing new ideas, discovering new things, or finding new value—skilled at developing new research questions, methods, and content. Compared to other personas, Type D shows the highest blog usage. When serving these users, attention must be paid to changes in problem definition during the Q&A process. After a certain degree of familiarity, the success rate for providing quality services (i.e., recommending other related service functions) is relatively high.

Interviewees received research direction from their advisors (Interview #07), explored and identified research topics themselves, and finalized them through discussion with their advisors. They cooperated with peers (Interview #27), exchanging and passing on laboratory experience. Their research topics required regular reporting to advisors, groups, and institutes (Interview #18). The directions provided by advisors came directly from national research plans they participated in, from which students derived their own research themes.

Although these users liked using electronic bulletin boards, blogs, and email, they had high requirements for academic functions and doubted whether network tools could truly serve academic purposes. They believed library electronic bulletin boards would have institutional or copyright restrictions (Interview #18) and that academic BBS information reliability might be insufficient (Interview #02). They considered current academic news subscriptions to lack content, being merely advertisements and spam, as they needed in-depth information rather than promotional material (Interview #35). Though having multiple email accounts, they used them only as storage space, applying for another when one became full (Interview #20). Additionally, they believed academic blogs were too arbitrary and insufficiently accurate (Interview #31) and

were not optimistic about library blogs, thinking many alternatives existed and that browsing didn' t guarantee attraction (Interview #05).

For Type D users with innovation-oriented characteristics, the following service strategy should be adopted: Type D users emphasize innovation and possess a certain degree of curiosity about new things or tools. If service methods are increased or new service functions are introduced, these users are more willing to try them compared to other personas. Without new services to attract attention, Type D users tend to turn to other service providers' functions. Therefore, developing new service methods and using novel tools to assist research helps attract this user type. Meanwhile, this group' s early attention to new library services also facilitates the promotion of new library functions.

5. Conclusion

In summary, based on these different types of typical users, creating and using personas can help us reconceptualize knowledge processes and knowledge services. By proposing typical users with specific behaviors and characteristics for digital libraries, and using graphical personas to describe user behaviors and needs, we can design library and information services for new knowledge environments.

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Note: Figure translations are in progress. See original paper for figures.