

Meal planning systems with focus on choice

– What affects the use and how can it be taken into account when designing such a system.

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The increasing use of the Internet for various purposes has resulted in different systems and tools to handle everyday situations. For meals this is done by different kinds of Meal Planning Systems (MPS). In this study we have evaluated an early version of a new MPS which allows the user to choose the meals he or she wants instead of getting a pre-planned menu. The purpose of the evaluation was to find out what to take into account when designing an MPS. The study was done in two steps - a pre-study and a test of the MPS where five families used such a system. In the pre-study we let 28 families fill in a questionnaire based on Theory of Planned Behavior in order to find factors that would affect their use of an MPS. Those factors were then used in an interview after the test of the MPS. The study resulted in a detailed description of how the underlying factors were dealt with in the actual system. From this the conclusion could be drawn that different families have different expectations and needs when it comes to using an MPS. We have identified four important areas that contain expectations and needs that should be considered while developing an MPS. These areas were Ordering over the Internet, Recipes, Social Aspects and Platform for Use.

INTRODUCTION

Today there are a number of different internet-based services for meal planning. The purpose of such services is mainly to let a customer order food on the web and have it delivered to their home. Several of these services have pre-defined menus and do not allow the customer to plan the meals according to what they themselves want to eat. According to research done by Meal Planning Concepts AB (2011), the most popular MPS with pre-defined menus have gotten 60 000 customers in three years. This shows that such a service is up to date.

PURPOSE

The main purpose of this project was to find out what is important to take into account when designing an MPS with the function to let the customer choose recipes for him- or herself. To do this, we have evaluated a pre-defined behavior: “to regularly plan and carry out the family grocery shopping through a web-based

Meal Planning Service”. The purpose was also to see how much interest there is among families with at least one child under 10 years to perform the given behavior and what affects their intention to do so.

BACKGROUND

Theory of Planned Behavior (TPB) is a theoretical framework designed by Martin Fishbein and Icek Ajzen (2010) as a further development of the Theory of Reasoned action. It can be used to analyze and predict behavior in various settings. In order to predict behavior according to TPB you need to determine the factors that affect the intention of performing the behavior. An intention reflects how motivated someone is to perform a certain behavior. According to TPB there are three types of motivational factors which put together indicate how hard people are willing to try in order to perform the behavior. Figure 1 explains how the

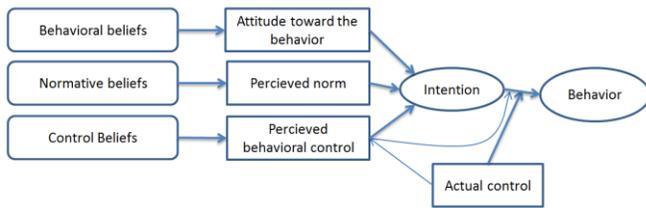


Figure 1. Theory of Planned Behavior

motivational factors relate to the behavior.

Behavioral beliefs are a person’s beliefs about the outcomes of performing a behavior. In turn these beliefs form an attitude towards the behavior.

Normative beliefs are a person’s perception of other individuals’ approval or disapproval of him performing the behavior. This leads to a perceived norm, which is a perceived social pressure to perform or not perform a behavior.

Control Beliefs reflect how much control an individual has over a specific situation e.g. how much effort they will need to perform the behavior. Together with the actual control it leads to a perceived behavioral control.

To identify the motivational factors, according to Fishbein and Ajzen (2010) a pre-study is needed. This is done in the form of a questionnaire. The pre-study questionnaire consisted of several pairs of questions. To extract control beliefs you need to identify the control factors by asking “what would hinder or make it easier for you to perform the behavior?”. To extract behavioral beliefs you need to identify the behavioral outcomes by asking “what positive or negative outcomes do you think follows performing the behavior?” In order to extract normative beliefs you need to find out the normative referents by asking “who can you think of who would approve or disapprove of you performing the behavior?” This is all in accordance with Fishbein and Ajzen (2010). We will refer to control factors, behavioral outcomes and normative referents as factor-types.

METHOD

To investigate the behavior we needed to identify the factors behind the behavior. The first step was a pre-study conducted in the form of an online survey targeted towards families with at least one child under the age of 10. We let the families answer in the form of free text responses and out of the 39 questionnaires sent, we got 28 responses.

We used Qualitative Content Analysis (Elo & Kyngäs, 2007) to categorize the replies. We collected all replies that fit in to one category and counted the amount of replies within the categories. In accordance with TPB we qualified only the most common categories as factors. We set the lower boundary to 3% out of all responses within that factor-type, with the exception of normative referents where we deemed the categories too few to exclude any of them.

In the second step we let five families test a beta version of an MPS named Meal Planner. Meal Planner was used in five households for approximately two and a half weeks. We followed up the test with interviews where the questions were based on the factors from the previous step. We related their replies to the identified factors by using Sentence Concentration by Kvale & Brinkmann (2009). Thereafter we divided them into the factor-types control factors, behavioral outcomes and normative referents.

RESULT OF THE PRE-STUDY

Here we present the measured interest of using a Meal Planning System among families, and the underlying factors to this behavior.

Would you consider using a Meal Planning System to do the majority							
Answer:	No, definitely not			Yes, definitely			
Scale:	1	2	3	4	5	6	7
Percentage	14,3	7,1	3,6	10,7	17,9	14,3	32,1

Table 1. Scaled question from pre-study questionnaire, used to determine respondents interest in using an MPS.

As shown in table 1, out of the 28 respondents to the survey 32% would definitely consider to use a MPS compared to the 14% who would definitely not consider it. In total 24% of the responses were on the negative side of the scale, 64% on the positive side, and the remaining 11% were neutral.

The pre-study also resulted in control factors, behavioral outcomes and normative referents that underlie the behavior. The factors are presented in Table 2 and 3.

Control Factors	Answer count	Behavioral Outcomes	Answer count
Cost	14	Time	21
Access to technology	14	Delivery	16
Usability	14	Usability/effectivity	13
Shopping list	9	Access to technology	10
Recipes	8	Inspiration	9
Allergies	7	Overview	8
Delivery	6	Planning	8
Time	6	Variation	7
Suggestions	4	Cost	6
Preferences	3	Health	6
Categorized Recipes	3	Products	5
Connection recipes/ shopping list	3	Personal goals	4

Table 2. Control Factors and Behavioral outcomes from the pre-study. The numbers reflect how many answers are connected to the factor.

Normative Referents	Answer count
Partner	7
Companies/Stores	5
The children	4
The Society	4
Friends	2
Allergics	1

Table 3. Normative referents from the pre-study. The numbers reflect how many answers are connected to the factor.

The factors in table 2 and table 3 are a product of our analysis and categorization of the replies from the pre-study survey. Each factor contains a set of sub-factors. E.g. the control factor "shopping list"

is built up by replies concerning the shopping list, this includes the possibility to choose quantity and brand of items to be ordered as well as a pre-sorted list of items if you want to do the shopping yourself. Sub-factors can be negative or positive, and sometimes both. All factors are built up the same way, some with more sub-factors than others.

The factors we could extract from the interview were roughly the same as the ones from the pre-study, with exceptions as follows. Within control factors we encountered two previously excluded factors, "discounts" and "trust for the system". Within behavioral outcomes we encountered one previously excluded factor "missing discounts". In the Interview we did not get replies to all the factors from the pre-study, the pre-study factors "access to technology", "cost" and "personal goals" were those without replies.

DISCUSSION

In this section we discuss the difference between the results from the pre-study and the test of the system, the importance of the different factor-types as well as what is important when designing an MPS

Similarities and differences between pre-study and the test of Meal Planner

The largest difference between the pre-study and the test of Meal Planner is that participants from the pre-study had to rely on their imaginative skill to picture how it would be to use an MPS. In contrast the participants from the test of Meal Planner had hands on experience. This means the replies from the pre-study respondents were influenced by their own view of what such a system would be whereas the participants who used Meal Planner were influenced by the implementation and limits of the tested system. We found no relevant replies from the test of Meal Planner interview which we were not able to categorize within the pre-study factors. This suggests that our pre-study captured all relevant factors which can be identified by this method.

The importance of the factor-types

Control factors are important to take into account when developing any system, since it affects the users perception of how much effort is needed to use the system (perform the behavior).

Some of the control factors from the test of Meal Planner were a result of the MPS not being fully developed. That is, participants complained over bugs, these comments qualified as control factors but are very obvious errors in the implementation. It is natural that the comments from the participants in the test of Meal Planner were more detailed. What was interesting was that the respondents in the pre-study were more focused on the price of the MPS than the participants of the test of Meal Planner. This may be due to the fact that the participants used it for free.

What a person believes is a behavioral outcome from the use of a system is an important determinant to whether they will begin or keep on using the system. If a person believes that the behavioral outcome is good, it leads to a higher probability that the behavior is performed Fishbein and Ajzen (2010). In our study the most frequently mentioned behavioral outcome is time, saving time, in particular. Many control factors reflect this by being suggestions of how such a system can help you save time.

The data from the test of Meal Planner-interview suggests that participants did not feel that social pressure in the form of normative referents was as important a determinant of their behavior as the other two factor types, unless these referents were directly affected by their usage of the system (family). For example the partner and children living with the MPS user will be affected by the recipes which affects the food they eat and so on. We suggest that the behavioral outcomes from performing the behavior directly affects family members and that this is why they are taken into such deliberate consideration compared to other groups of referents.

Things to consider when developing a Meal planning system

By considering the answers from the questionnaire and the interviews we have recognized four areas that are important to have in mind while designing and developing a web-based Meal Planning System.

Ordering over the Internet

When you order a product, it is important to have information about the items in terms of price, brand, amount and sort, which you automatically get when you walk in a store. Without this information, it becomes difficult for the customer to know what their order will cost and which products are going to be delivered. An MPS should therefore in some way provide the customer with information on price and give him or her the possibility to control which products are selected by the store based on these parameters.

Fruits and Vegetables are distinguished from other product categories, as the customer often wants to choose these products by touching them to determine their quality. Therefore it may be necessary to consider whether to give the customer an opportunity to choose these products in a different way than other products, and how this could be done.

In our study we found participants who did not want to order food over the Internet. Instead they wanted to go to the store and buy their groceries as usual, still they enjoyed the use the MPS as a planning tool. In order to satisfy the needs of these customers, the MPS should be designed to have the planning and the ordering in different sections.

Recipes

An important part of planning is the selection of recipes. What is considered to be a good recipe differs greatly between individuals. It may therefore be important to create a large database of recipes to offer something that appeals to

everyone. A disadvantage with a large database is that it might cause a bad overview which makes it difficult to find the recipes. It may therefore be beneficial for the user to have the possibility to filter the recipes based on preferences, and in general have a good search function.

It is also important that there is a possibility to add your own recipes and thereby expand the database. To further help the user to navigate through the recipes, it is important that the recipes are well sorted in categories such as "Pasta" or "Fish". The problem is that not everyone agrees on what is a good categorization. Perhaps the user could have the possibility to create custom categories according to what they consider appropriate. Different users have different needs with regards to allergies and preferences, which can be a good thing to take into account when making the categorization and the search function. There is also an advantage in letting the user go back to previous weeks to check earlier meals in order to re-use recipes.

One problem that the users mentioned with the recipes was that they sometimes want to get ingredients of a different amount than what was specified in the recipe. Different users might want other ingredients than those in the recipes. Therefore it should be easy to modify the order and replace/modify the items in the shopping list.

It is also worth remembering that the user does not always eat what was planned in the tool, therefore it would be good to have a function that allows the user to change the planning, both retro- and proactive.

Social Aspects

From our data, we conclude that not only the system but also the people who are close to the user can affect his or her use of the system. It is a good idea to look at how the system can be made more social, perhaps by allowing a user to share their recipes. A social feature in the MPS could increase the numbers of normative referents or strengthen their influence.

Platforms for Use

We received several comments where people suggested different platforms to use for the MPS. Mainly this was people telling us they wanted a mobile application, some wanted this application as a way to take the shopping list with you, others wanted to be able to view their plans and possibly have a full-fledged MPS on their phone.

Furthermore, while cooking, you want the recipe to be easy to view. We have received several replies suggesting that this could be done by the user printing the recipe, others suggest an easy-to-view iPad-application, and other yet, suggest a cooking-friendly view in the computer version of the program. We can see that people want to use the recipes in various ways. Recipes should be easy to access in the system, and adaptable to how the user prefers to use them.

CONCLUSION

In this study we have identified a positive attitude from 64% of the participants to use an MPS based on the results from the pre-study. This interest is based on a variety of factors that are linked to the possible results of the behavior, how much control the individual has over the behavior and the social press from others to perform the behavior.

Based on the factors, we identified four key-areas that can be taken into account when designing and developing an MPS. These four areas are the previously discussed: "ordering over the internet", "recipes and ingredients", "social aspects" and "platforms for use". From these four areas, there are some features that would be possible to be individualized by the user and some of the areas could be functions incorporated naturally in the systems. The different "platforms for use" could be predesigned functions in the system, as well as the ability to share recipes, which is an example of how "social aspects" could be handled. This indicates that different

families have different needs when it comes to using an MPS to plan their meals.

In addition, an MPS could benefit by being adaptable both related to the ingredients in the order and by the possibility to create and change the recipes.

Adaptability should not antecede the user-friendliness. Instead there should be a balance between what the user can customize to their needs and what is automatically presented in the system.

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