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Towards a Taxonomy of Airport Passenger Activities.

Towards a Taxonomy of Airport Passenger Activities

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Airports are vital sources of income to a country and city. Airports are often understood from a management perspective, rather than a passenger perspective. As passengers are a vital customer of airports, a passenger perspective can provide a novel approach in understanding and improving the airport experience. This paper focuses on the study of passenger experiences at airports. This research is built on recent investigations of passenger discretionary activities in airports by the authors, which have provided a new perspective on understanding the airport experience.

The research reported in this paper involves field studies at three Australian airports. Seventy one people who had impending travel were recruited to take part in the field study. Data collection methods included video-recorded observation and post-travel interviews. Observations were coded and a list of activities performed was developed. These activities were then classified into an activity taxonomy, depending on the activity location and context.

The study demonstrates that there is a wide range of activities performed by passengers as they navigate through the airport. The emerging activity taxonomy consists of eight categories. They include: (i) processing (ii) preparatory (iii) consumptive (iv) social (v) entertainment (vi) passive (vii) queuing and (viii) moving.

The research provides a novel perspective to understand the experience of passenger at international airports. It has been applied in airports to improve passenger processing and reduce waiting times. The significance of the taxonomy lies in its potential application to airport terminal design and how it can be utilised to understand and improve the passenger experience.

Keywords : Activity-centred design, airport experience, passenger experience, taxonomy

Introduction

Passengers are vital customers of airports who expect an efficient, pleasant and safe experience. A pleasant airport experience has been described as an important way to encourage spending and influence future travel plans (Airport Council International, 2008), while a poor experience has been identified as a threat to a city/country's economic stability (London First, 2008). For these reasons, airports have had to become increasingly customer focused. To ensure a passenger's experience is pleasant it is necessary to understand what is important to a passenger, and how airports could respond to any shortcomings. Historically, research about passenger experience has been completed from a management perspective, and has focused on the time it takes passenger to get through the processing domains of check-in, security, customs and boarding. However, there is a lack of research that focuses on the passenger's perspective. In the limited research that takes a passenger perspective the focus is on the introduction of new technologies. The International Air Transport Association (IATA) has looked at improving the passenger travel experience by replacing repetitive checks of passengers and their documents with new streamlined systems (International Air Transport Association, 2009). This technology-focused program has an emphasis on processing activities. Getting "permission to board" is sought at all processing domains. However, the current research is not based on an adequate analysis of the present situation in airports, and lacks a passenger centred approach (Kraal, Popovic, & Kirk, 2009; Popovic, Kraal, & Kirk, 2009).

An activity-centred approach allows interactions with interfaces to be understood in a social, cultural and emotional context (Gay & Hembrooke, 2004; Norman, 1998). These contexts are essential to understanding the experience of users (Popovic, 2007). Authors have recently developed a novel approach to understand passengers as users of an airport (Kraal *et al.*, 2009; Popovic *et al.*, 2009). This approach concentrates on the activities passengers undertake in airports, rather than just the time it takes passengers to complete processing tasks. This unique approach allows researchers to understand passengers' full airport experience. It can provide insight into simple ways to support and improve passenger flow. This research aims to address the lack of understanding of the complete passenger experience by answering the question "what do passengers do during an airport experience?" By understanding the activities, the sequence of activities and the reason why they were carried out the research is able to provide insight into how to support and improve the processing of passengers. The activity-centred approach can identify problems in the sequence of processing activities in airports

Airport processes are not the only focus of the research. A large part of the airport experience involves non-processing periods, referred to as enforced leisure time (Rowley & Slack, 1999), or discretionary time (Popovic *et al.*, 2009). This part of the experience can account for around two thirds of the total time at the airport (Underhill, 2008). Discretionary activities can occur throughout the airport experience (figure 1) and have not been well explored. Figure 1 illustrates the processing domains passenger needs to get through at an airport. The four domains of the airport are check-in, security, customs and boarding. Between these processing domains the passenger can undertake discretionary activities such as shopping or getting something to eat.

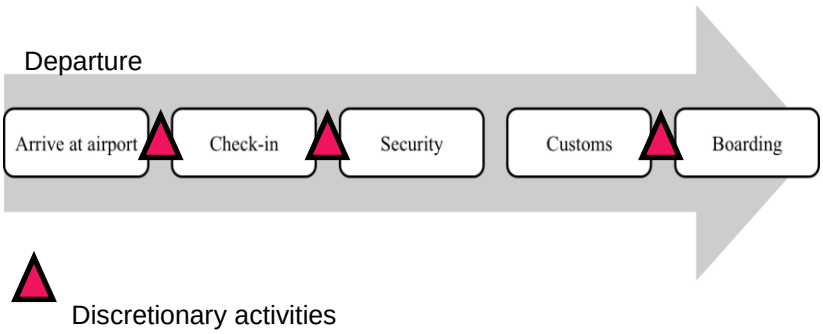

Figure 1 Processing domains at international departures

Methods

Data was collected at three airports in Australia: Brisbane International Airport, Melbourne International Airport and the Gold Coast International Airport. All data was collected between June 2010 and May 2011 with seventy one passengers agreeing to be observed. Passengers at Brisbane Airport were recruited weeks before their departure date through advertising in Brisbane city centre retail outlets, and around university campuses. Passengers using an airline executive lounge were excluded from the research. No other selection criteria were used. Passengers at Melbourne and Gold Coast Airport were recruited as they entered the airport on their day of travel. Those passengers using an airline executive lounge were excluded. Once observations were commenced the observed passenger was followed at a discreet distance by the researcher. All activities undertaken by the passenger were recorded on video camera. At all times the distance between the researcher and observed passenger was between five and fifteen meters. After the completion of the observations video footage was coded through the use of Observer software (Noldus, 2011). A coding scheme was developed which listed the activities performed by each passenger. This coding scheme was developed as coding progressed, and was validated by independent coders to ensure consistency and accuracy. Passengers took part in a retrospective interview which was recorded and transcribed for analysis. Coding of the interviews was supported by Atlas (Atlas.ti, 2010). Interviews clarified passengers experiences; what the passenger had done and why. During the retrospective interview passengers were asked to watch several ten second clips of interesting occurrences throughout their airport experience which they discussed.

Observer (Noldus, 2011) was used to generate maps of passenger activities. These maps, in conjunction with the retrospective interviews, assisted in generating a list of activities (table 1).

Table 1
The list of activities in an airport

Activity list		
Interact with staff	Interact with group	Interact with non-group
Interact with own technology	Interact with airport technology	Repacking
Unpacking	Reading/writing	Eating/drinking
Browsing	Purchasing	Lying/sleeping
Sitting	Waiting/standing	Walking without luggage
Walking with luggage	Walking with pram	Walking with trolley
Being scanned	Filling out Outgoing Passenger Card (OPC)	Random extra security check
Set-off scanner	Checking signage	Checking flight information
Using water fountain	Smoking	Saying goodbye
Grooming	Queuing	

Development of taxonomic groups

Taxonomic groups were developed from both the activities and the context in which they were carried out. The context was dependent on the location, whether a passenger was being processed or not, and how the passenger described what occurred in the retrospective interview. The below examples show how four of the taxonomic groups developed out of the activity of “interacting with staff”. All passengers were seen to do this activity during their airport experience and four contexts were observed.

First, when a passenger was being processed – the passenger and staff member would discuss the check-in process (figure 2). The output from Observer (the left of figure 2) shows the passenger was being processed at check-in, and after queuing, interacted with a staff member. The video shows the passenger (in red) and check-in staff member (in blue) interacting. This activity was grouped as “processing”.

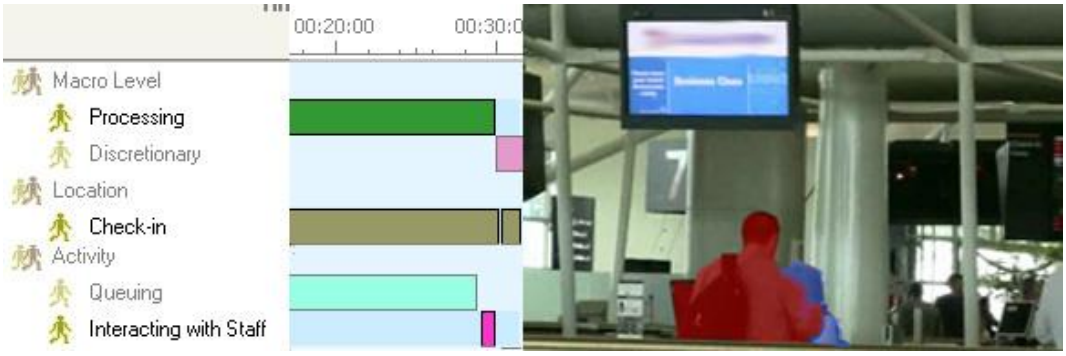

Figure 2 Interaction between a passenger and staff member at check-in

Second, when a staff member would discuss an upcoming step in the airport experience – the output from Observer and the video show the passenger interacting with a staff member (figure 2). The context was the same but the interaction differed. This was described by the passenger as “Yeah it [the Outgoing Passenger Card] was handed to me at the check-in counter” and “they informed me [to fill it out]”. This interaction involved

the staff member informing the passenger of a step they needed to complete; preparing for a future processing activity. This activity was grouped as “preparatory”

Third, passengers described having a social conversation with staff members – the interaction had nothing to do with the airport process. It was an informal conversation between the staff and passenger. The output from Observer (the left of figure 3) shows the passenger was at a shop and interacted with a staff member. The video shows the passenger (in red) and check-in staff member (in blue) interacting. The context of the interaction was social as the passenger described the interaction as “they were talking to us about babies, and they were quite funny. They were joking.” This activity was grouped as “social”.

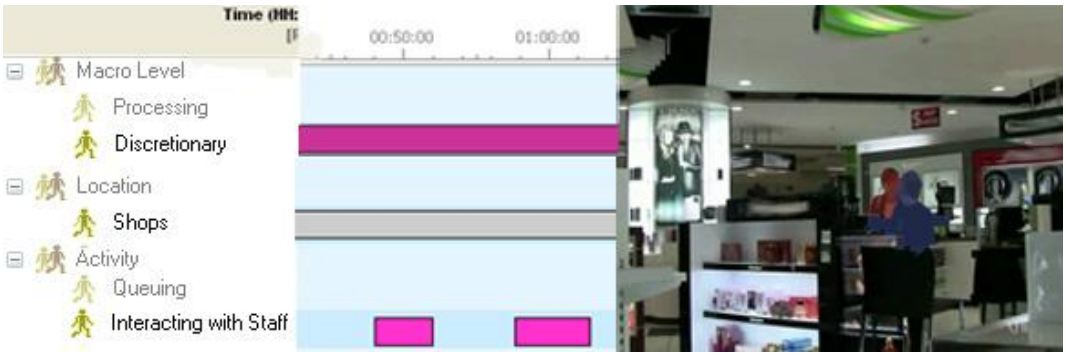

Figure 3 Interaction between a passenger and staff member at duty free

Finally, when staff members and passengers interacted in retail outlets – the interaction was about a product in the shop (figure 3). The context of the interaction was to do with a potential purchase as the passenger said “I was able to ask her a little bit more information about what products they had.” This activity was grouped as “consumptive”.

As can be seen in the above examples the taxonomic groups come from the observed activity and the context of the activity. Figures 2 and 3 show the same interaction but the retrospective interview with the passengers shows the different contexts. By analyzing the activities and the context eight taxonomic groups have been developed. These eight taxonomic groups will now be outlined and how these groups impact airport processes, passenger flow and experience will be considered.

Outline of taxonomic groups

Table 2 shows eight taxonomic groups and the associated activities and demonstrates that each of the twenty-nine activities fits into at least one taxonomic group. However, many of the activities belong into more than one taxonomic group. Each group will be discussed with respect to how the eight categories impact passenger flow, processes and experience.

Table 2

The eight taxonomic groups and associated activities

Taxonomic Group	*Associated activities*
Processing	Interacting with staff Filling out OPC Being scanned Setting of scanner Random extra security check
Preparatory	Interacting with staff Filling out OPC Interacting with own technology Interacting with airport technology Unpacking Repacking Reading/writing Checking flight information Grooming Checking signage
Consumptive	Interacting with staff Interacting with own group Interacting with airport technology Eating/drinking Browsing Purchasing Using water fountain Smoking
Social	Interacting with staff Interacting with group member Interacting with own technology Reading/writing Eating/drinking Interacting with non-group member Saying goodbye
Entertainment	Interacting with own technology Interacting with airport technology Reading/writing Checking flight information Browsing
Passive	Waiting/standing Sitting Lying/sleeping
Queuing	Queuing
Moving	Walking with luggage Walking without luggage Walking with trolley Walking with pram

Processing activities

Processing activities occurred when observed passengers were being processed at the various airport domains: check-in, security, customs or boarding (figure 1). These activities are an essential part of the passenger being able to board their flight. Processing activities can only occur at processing domains. Currently processing activities only occur between the passenger and a member of staff at the airport. There was no observation of passengers being able to use airport technology, as there was no technology available to complete processing activities. However, this will change in the future with technology likely to become a dominant feature of processing activities

(International Air Transport Association, 2009). Processing activities were regarded by passengers as necessary, with passengers having little control over what happens. Passengers referred to processing as “a necessary hassle” in the airport experience.

The amount of time passengers spent undertaking processing activities impacts the airport as it is used as a measure of how well an airport is performing (Consumer Protection Group, 2009; Meyer & Schwager, 2007). The time taken for passengers to get through security or check-in are examples of measurements of airport performance. If passengers are aware of upcoming processing domains they can complete preparatory activities which can reduce the amount of time a passenger spends being processed.

Preparatory activities

Preparatory activities occurred when passengers were preparing for subsequent processing and/or discretionary experiences. Preparatory activities were carried out more often by experienced passengers. These activities also occurred more often when staff instructed passengers of future activities they would need to carry out. An example was observed at check-in when staff instructed passengers that they need to complete their Outgoing Passenger Card (OPC) before customs. Another example was when duty free staff instructed passengers that they could purchase items, such as alcohol, now and collect it on their way back through the airport on their return. This is an example of an activity that is preparatory but leads to a consumptive activity.

Preparatory activities are potentially the most important to the airport as they allow the passenger to prepare themselves for next processing domains. When passengers were prepared for a domain they often proceeded more quickly. For example passengers completed security on their first attempt when they had removed all ‘risk’ items from their person (such as liquids, laptops, metal objects) beforehand. When passengers were not prepared they had to return for a second scan, or have their bag searched. This could lead to delays to other passengers at security. A useful preparatory activity observed was when passengers completed their OPC before entering customs. Failing to complete this document has been identified as a major source of delay and frustration at customs (Rehbein AOS, 2007). Preparatory activities also provided the passengers with a degree of control over the airport process. If they could prepare for a domain they could attempt to control to some degree how successful the interaction was. Airports need to provide both the information and a location to carry out preparatory activities.

Consumptive activities

Consumptive activities occurred when passengers browsed, purchased or consumed items. Consumptive activities are extremely important to airports as they are a major source of income (Graham, 2009). Consumptive activities were also important to passengers as they were used as a method to reduce their perceived waiting. Many passengers stated that “killing time” was a very important part of their airport experience. Killing time involved passengers browsing through the shops, often without the aim of purchasing any products. These activities were influenced by whether the passenger was accompanied and who accompanied them (Livingstone, Popovic, Kraal, & Kirk, 2012).

Social activities

Social activities occurred when passengers interacted with another person. They were the most frequent interaction passengers undertook. Again these activities were often stated as a method to “kill time” at the airport.

Social activities are viewed by passengers as a positive way to spend their time in the airport. However social activities can cause problems to the airport processes. Groups

often waited for other members, allowing their group to reform, but this could cause obstructions to passenger flow. Passengers can also be accompanied by non-travellers, referred to as “wavers”. Wavers are people who go to the airport to see their passenger off, but do not travel on and therefore do not have to undertake any processing activities. Wavers and passengers often say goodbye close to the entrance to security. This was observed to cause obstructions to the flow of other passengers. In other situations, social activities were observed to benefit the airport. Benefits occur when experienced travelers informed novice travelers of activities need to be completed for upcoming processing domains, or about rules on the amount of alcohol allowed to be carried to their country of destination.

Entertainment activities

Entertainment activities occurred when passengers would entertain themselves, with no other people involved. Again this was done as a way to “kill time” until departure. Entertainment activities could comprise up to 73% of a passengers discretionary time. Passengers considered entertainment activities to be a very important aspect of their airport experience. The lack of entertainment facilities was mentioned by passengers as a major frustration. This was mainly due to no easily accessible wireless internet.

The main entertainment activity was ‘interacting with own technology’. This activity was hard to distinguish as to which category it fitted into. For example, passengers gave entertainment, social and preparatory contexts for their interactions. Some interactions were playing games (entertainment), communicating with friends (social) or booking further accommodation (preparatory). Categorisation of each case of technology use was difficult as passengers often could not recall which context each activity was undertaken within. Entertainment activities were particularly prominent with passengers travelling alone.

Passive activities

Passive activities occurred when passengers sat passively somewhere in the airport, and were viewed as both positive and negative experiences. Some passengers who sat and waited said that this was a negative experience, as they were bored, and that there was nothing to do at the airport. However other passengers stated they liked this time as they were able to relax and use this time to do nothing. It is important to ensure that there are areas in the terminal to allow passengers to do these passive activities if they choose to. However to improve passenger experience airports should concentrate on reducing unwanted passive periods. The main improvement passengers stated was easily accessible wireless internet to reduce unwanted passive periods.

Queuing

Queuing occurs throughout the airport experience in both processing and discretionary times. However, when passengers were asked about what they expected to happen at an airport they referred only to queuing when discussing processing domains. No passengers mentioned having to queue when discussing discretionary times. Instead, they referred to having to wait rather than queue during discretionary times.

Moving activities

Moving activities occurred throughout the airport, getting from place to place. These activities were related to how passengers got through the airport, and what objects accompanied them, for example, luggage, trolleys, and prams. These activities are important for passengers to consider as they need to get from the entrance of the airport

to boarding in the allocated time, otherwise they will miss their flight. These activities are also important for the airport for the same reason.

Discussion

This research has demonstrated the range of activities that passengers do while at an airport and provides a novel perspective of the airport experience. Airport research generally focuses on a management perspective concentrating on the time for passenger to complete specific domains (figure 1). This research focuses on the passengers, looking at their whole departure experience including discretionary periods. Discretionary periods accounted for approximately two thirds of passengers' whole airport experience. An activity-centred approach allows us to understand what activities passengers undertake and how these can assist or hinder the airport processes. The taxonomy described in this paper takes this understanding further by not only describing the activities, but also the context(s) in which these activities occur.

Eight taxonomic groups were identified:

Processing	Entertainment
Preparatory	Passive
Consumptive	Queuing
Social	Moving

These taxonomic groups illustrate that previous airport research has predominantly focused on processing and queuing activities to the exclusion of six other activities that passengers undertake (Consumer Protection Group, 2009; Pitt, Wai, & Teck, 2001; Transportation Research Board of the National Academies, 2008). Consumptive activities have become more interesting to airports and airport research as they have become an important source of income (Graham, 2008). However, the other five groups (preparatory, social, entertainment, passive and moving) have been largely ignored. This paper has shown how the eight activity groups can provide an original understanding of a passengers airport experience. For example, preparatory activities are important to the airport, with the potential to improve processing facilitation. Preparatory activities are important to passengers as they give them a degree of perceived control over airport processing. It is important for airports to provide both the information and a location for passenger to carry out these activities. There is a potential to design activities to co-occur with other taxonomic groups. For example, passengers were observed to sit in a café, buy a coffee, talk and fill out their Outgoing Passenger Card (OPC). This shows preparatory, consumptive and social taxonomic groups co-occurring to improve passenger processing, experience and airport income generation.

The taxonomic groups also demonstrate how passengers deal with reducing their perceived waiting time at the airport. This "enforced leisure time" (Rowley & Slack, 1999) was viewed negatively by some passengers. When time was perceived to pass quicker than the passenger expected this was viewed positively. The lack of entertainment and consumptive activities in the airports received the most negative comments. By providing easily accessible entertainment facilities such as cheap/free wireless internet airports can support improved passenger experiences. However, it is interesting that in one airport where internet is provided free, passengers did not mention the availability. This means an airport may not receive positive feedback when items such as free wifi are provided. However, they will receive negative feedback when these items are not available. By understanding that passengers used their technology often, and allocated a significant proportion of their time to its use shows the importance. The allocation of a large amount

of time provides feedback to the airport about its importance to the passenger experience.

Using the taxomomic groups to improve passenger processing has already been practically demonstrated within an airport (Popovic, Kraal, & Kirk, Unpublished). It was recommended that a staff member should be placed in the security domain well before passengers approach the x-ray machine. This allowed passengers to undertake preparatory activities before approaching the security domain. Passengers could gain information on exactly how they needed to prepare themselves before reaching the security check point. Passengers were able to ask questions on what items they needed to remove from themselves and their bags. Conversations with staff took place away from the main queue of the x-ray. Once the passenger was prepared for getting through security they would join the queue. Passengers would get through security on their first approach, and not have to undergo additional checks. The application of this recommendation resulted in a reduction in average waiting times from 20 minutes to 3.9 minutes, and an increase from 260 passengers per hour to 340 per hour being processed through security. This throughput of passengers was previously unheard of at Australian international airports. This practical application shows the benefit that the taxonomy can add to the airport experience. Through the knowledge of how passengers use the airport, how they navigate the various processes, and what they do during their non-processing times, airports can better manage and facilitate the airport experience for passengers.

Limitations

There are a number of limitations associated with this research. Passengers were aware of being video recorded through their airport experience and this knowledge has the potential to alter the activities passengers normally undertake. However, ethically there is no way to record passengers without their knowledge. Passengers often commented during their retrospective interviews that they often forgot they were being recorded. Another limitation could be the number of passengers who participated in the study. Seventy one passengers could be considered a small proportion of the total number of passengers leaving from the three airports investigated. However, if the amount of video footage is considered, a total of 131 hours was recorded, containing thousands of individual activities, interactions and experiences. This method provides a unique understanding of airport experience from a passenger's perspective, which has been missing from current research.

Conclusion and future studies

This research has given a novel perspective to understand the experience of passengers at international departures. Close examinations of the activities passengers choose to undertake, and the context in which they are undertaken has led to a taxonomy of passenger activities. This taxonomy had demonstrated practical applications to improve passenger processing, for example the increased passenger processing at security. Increasing the potential of passengers undertaking preparatory activities at security has increased passenger throughput and decreased waiting times. Increased passenger flow is a great benefit for an airport as processing time is used as a measurement of efficiency. Reduced waiting time benefits passengers as it provided them with a greater sense of control of their experience. Airports can also improve the experience by redesigning existing facilities for the other activity groups to occur, for example by providing areas where passengers can do either passive or social activities. The significance of the taxonomy lies in its potential application to airport terminal design, and how it can be applied to understand and improve the passenger experience. The findings are transferable to other airports. Future research will look at understanding how the

groups interact throughout the airport, and will develop the relationships that exist between the activities, passenger flow and passenger experience.

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