FOCUS ON INPUT

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ANTI-VANDAL KEYBOARDS VS. STANDARD KEYBOARDS IN INTERACTIVE KIOSKS

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Design for Public Use:

One of the most difficult issues that face successful kiosk deployments today is the ability to design products which can withstand the rigorous environment they are exposed to by being in public environments.

In a perfect world, products would be designed, built and deployed without any risk of vandalism or adverse environmental effects. Unfortunately we do not live in a perfect world.

Many factors come in play when considering different components to be integrated into public use kiosks. Cost, durability, ease-of-use and reliability are probably the four top issues considered.

Many times, the last three are sacrificed in pursuit of the highest possible selling margin for a kiosk or to create that small cost-competitive advantage with a desire to secure a contract over a competitor.

However, consider this, in sacrificing durability, ease-of-use and reliability, what long-term affect will it have on repeat business from a client or referral business if the lowest cost is pursued up front without considering the reliability and customer satisfaction that comes with providing durable solutions which simply function as intended over the life of the system?

Environmental Factors:

In choosing appropriate input solutions for a public use Kiosk, environmental factors play a large part.

Moisture is typically the number one contributing factor to environmental based field failures. Damage from moisture can come from rain, snow, high humidity environments, liquid drinks from the public or in some cases even "over-spray" in environments near plants which require maintenance, such as in a shopping mall.

In this issue:

By addressing moisture properly up front, not only are potentially adverse conditions addressed, but maintenance issues also become beneficiaries.

With proper moisture sealing, it becomes possible to clean and maintain an input devices much easier than a non-sealed solutions. The ability for maintenance personnel to flood the surface, or mist cleaning solutions is a time saving and more effective method for cleaning. Input devices that cannot handle moisture consume a great amount in time in the cleaning process due to the need for very careful cleaning procedures.

Non-sealed solutions, if cleaned improperly may encounter field failures during the cleaning process if excessive amounts of cleaning solutions penetrate to the sensitive electronic circuitry.

Exposure to UV is another other environmental factor which needs to be taken into consideration.

Over time, extended exposure to UV can highly discolor plastic key solutions having an adverse affects toward the esthetics of a system. In some

cases, UV can even fade key legends to the point that they are no longer visible.

Additionally, printed legends on a keyboard almost always wear off over time simply due to extended use.

The most effective approach to avoid these problems is to use a device which features plated metal keycaps and to utilize a laser etching process for the legends, which create a near life long longevity for the legends.

Vandalism Concerns:

Historical data shows that mechanical based keyboards or elastomer based keyboards in public environment kiosks average an annual failure rate of 26% in volume deployments due to vandalism by the public.

Vandalism of keyboards on a deployment that occurred in 1999 can be directly attributed to the overall failure of the deployment.

Deployed with traditional plastic key style keyboards, this deployment experienced a high level of field service requests due to missing keys. After approximately 6 months, the company who deployed these systems finally gave up and would ignore service requests due to missing keys. Needless to say, with keys missing, traffic on these systems was rapidly reduced to almost zero due to their inability to function properly.

Plastic key based keyboards are susceptible to users removing keys, cutting them with knives and even melting them with cigarettes and cigarette lighters.

Removed keys, cut or torn elastomer and melted keys are just a few of the results of vandalism we see in replaced keyboards.

To combat susceptibility to these issues, metal keys, secured from beneath the bezel are highly desirable.

Usability:

Probably the easiest consideration to evaluate is the usability of the keyboard.

Flat keys with little travel are very difficult to type on. These approaches do not provide adequate tactile response to accommodate efficient touch-typing methods. Additionally, these flat approaches also create difficulty in maintaining efficient key location. With keys on the same plane as the bezel material separating the keys, it becomes difficult to distinguish by feel whether or not users fingers are on they key or on the key surround area.

These approaches can have an adverse affect on the users experience and could discourage frequent or extended use of the system. User studies have shown that a key travel of 1.5mm is ideally suited for user comfort in typing activity that does not involve hours of use. Less than 1mm in key travel has shown to be extremely difficult to achieve any level of accurate typing or comfort among users.

Key shape is another critical concern. Keys must be designed to comfortably accept the surface of a users finger. Key shapes and sizes that do not provide a comfortable landing area for the finger tend to allow a users finger to fall of the surface making typing difficult and inefficient.

Lastly is key spacing. Although space is a big concern, efficient and comfortable typing can only be achieved through standardized key spacing from center to center of the keycaps. Miniature keyboards do not provide a keyboarding solution that is familiar to a user and can greatly impact the overall user experience, again affecting frequency and extended use of the kiosk.

Serviceability:

Regardless of keyboard durability, serviceability becomes a large concern. The ability to quickly remove and replace a keyboard is paramount. This not only affects service costs due to time, but can also have an impact on the front end in terms of the time it takes a kiosk producer to install the keyboard.

Difficult integration methods such as the need to utilize secondary bracketing systems can be not only difficult to engineer around, they can also have an adverse affect of labor efficiencies during initial kiosk assembly.

During service operations, it is important to consider that the field service technician may not be immediately familiar with the construction of the kiosk or the method used to install the

keyboard. Straightforward integration approaches can streamline any need to remove the keyboard in the field.

Long-term financial impact:

Frequently, the desire to save costs up front, or the desire to create an initial price advantage in order to secure an account from a competitor can have a greater financial impact than initially expected.

Data based on actual deployments of kiosks which incorporated keyboards with traditional desktop designs, notebook styles of construction and elastomer based approaches demonstrates a field failure rate due to environmental and vandalism issues of approximately 26% annually. Other industry-based studies suggest that this number is actually as high as 35%.

The following chart represents the long-term financial impact that may be experienced due to the integration of a keyboarding technology not specifically designed to handle the rigors of public use.

1000 System Kiosk Deployment 2/year lifespan Cost of Annual Failures	Traditional Mechanical Keyboards	Elastomer Based Keyboards	Anti-Vandal Keyboards
Initial Unit Cost	$40.00	$150.00	$270.00
Total Initial Cost	***$40,000.00***	***$150,000.00***	***$270,000.00***
Annual Failure Rate	26%	26%	0%
Required Replacements	260	260	0
Cost of Replacements	$10,400	$39,000	0
X 2 years (Total)	***$20,800***	***$78,000***	***$0***
Avg Service call to replace	$216.00	$216.00	$216.00
Total Service call cost	$56,160	$56,160	0
X 2 years (Total)	***$112,320***	***$112,320***	***$0***
Avg Down-time to service:	3 days	3 days	$0
x 2 years	6	6	$0
*** Revenue lost per unit/day**	90	90	$0
Total Lost Revenue(per failure):	540	540	0
Total Lost Revenue (all failures):	***$140,400***	***$140,400***	***$0***
Total Cost of Keyboards (life)	*$313,520.00*	*$480,720.00*	*$270,000.00*
Client Satisfaction	**Negative**	**Negative**	**Very Positive**

* Revenues per unit used in this model are based on averages collected from clients of Input Technologies. They are a mix of cash generating kiosks that are pay-for-use, costs of calculated value of space of retailers etc. and averaged. To fully evaluate the impact this could have on a specific project, this number should be replaced with actual known numbers for the specific application.

As you can see, the long-term financial impact can be quite substantial.

Customer Satisfaction:

Most successful business models rely on repeat business and referral business. This is especially important in the Kiosk industry because it goes a bit further than the client who is purchasing the kiosk. Repeat use and recommendations to use by the audience to a kiosk is also a major factor in the success of the kiosk.

If a kiosk program is deployed with equipment that cannot accommodate the rigors of public use, it is going to create a snowball effect. First the user will not have a pleasant experience causing them not to use the kiosk again. Second, the user will mo re than likely not recommend the use of the kiosk to other people. This leads directly into the low level of satisfaction that the client who paid for the kiosk will have.

The importance of satisfaction of the client purchasing the actual kiosk is paramo unt to that client either increasing their deployment over time, re-launching using the same supplier when the initial deployment has reached is effective life span and to their desire to recommend the supplier for other 3rd party Kiosk programs.

Summary:

Are there applications where a kiosk does not need to utilize highly rugged keyboarding solutions designed for public use environments? Of course, there are numerous kiosk applications that are not intended for public use, or that are highly supervised user interaction sessions.

However, most environments in which kiosks are deployed are intended for unsupervised user interaction, which makes the kiosk highly susceptible to all the items described in this paper.

To summarize keys factors that should be considered in the selection of a keyboard for integration in a kiosk, keep the following items in mind:

- The level of "sealing" a keyboard has against moisture.
- The durability of key construction such as metal vs. other less durable materials.
- The durability of the legends such as laser etching which provides a life long solution.
- Key travel for user comfort and efficiency.
- Key shape for user comfort and efficiency.
- Key spacing for user comfort and efficiency.
- Secured keycaps which cannot be removed.
- Ease of integration.

And lastly, providing a product, which gives the client ease of mind that, their system will be functional and free of reliability issues. Close consideration of these items can ensure that not only will a deployment be highly successful, but also provide a highly positive user experience.

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