

Appliances and Software: the Buyer's Warranty and the Developer's Liability

Daniel M. Berry

Computer Science Department, University of Waterloo
Waterloo, Ontario N2L 3G1, Canada
dberry@uwaterloo.ca

Recent Purchases of Appliances and SW

In the last two years (as of November, 1999), I have bought four appliances and four pieces of SW.

I am still using all the appliances.

I have yet to get the two of the programs running; of these, one is gathering dust on my shelf and one has been returned for a refund.

The other two programs are working.

The Four Appliances

1. Sharp Carousel Microwave Oven
2. RCA Color Television
3. Toshiba Video Cassette Recorder
4. Hoover Futura Vacuum Cleaner

The Four Programs

1. Adobe Illustrator 7.0
2. Adobe Acrobat Exchange 3.0
3. Microsoft Office '97
4. Languageforce Deluxe Universal Translator

These 4 programs are developed for sale to the mass market and are different from *bespoke* SW developed by one producer under a specific negotiated contract for a specific client.

Case Study

These eight personal experiences amount to a case study giving anecdotal evidence in support of a popular perception that consumer SW is of considerably poorer quality than consumer appliances.

SW Released Too Early

SW is being released before it is ready.

SW is going out for sale to consumers before it is certain that it will run and with the documentation woefully inadequate and even incorrect.

Fixing broken SW does not work; and next release has its own new bugs.

SW Service is Lousy

Manufacturers seem unprepared and even unwilling to service their shoddy merchandise.

Might even be that the merchandise is so shoddy that the service people are overwhelmed and the shoddy service is a direct result of this overload.

Rush to Market

A major reason SW is released before its ready is the pressure to be the first on the market.

Whoever is first usually gets and keeps a vast majority of the market.*

The second to the market usually gets very little of the market and fails as a business, *unless* its product is perceived as at least an order of magnitude better than that of the first.

*The exception that proves the rule is Macintosh OS vs. MS Windows.

Incentives

High incentive to release early.

Since customers accept s--t, very little incentive to delay to improve product.

Appliances Work & Are Serviced Well

Appliances for sale generally work with no trouble and continue to work

When they need service, the manufacturers stand behind the product and service the products in a reasonable time.

Once serviced, the problems seem to be solved.

Differences Between SW and Appliance Productions

What are the differences between appliances and SW that might account for this observed difference in quality?

One Key Difference—Warranties

One key difference is the difference in the warranty that comes with appliances and with SW.

An appliance is forced by law in most locales in the U.S. and Canada to have a warranty of fitness for its purpose.

That is, the product is guaranteed to function as what it *is*.

If I buy a television set, the manufacturer guarantees that it functions as a television set and ...

as a television set as understood by the man in the street.

One Key Difference, Cont'd

Mass-produced SW traditionally comes with a shrinkwrapped license that says that the manufacturer warrants almost nothing about the behavior of the SW.

The manufacturer does warrant the medium on which one buys the SW, the diskettes or the CD ROM.

One Key Difference, Cont'd

In other words, the manufacturer refuses to guarantee

- that **Illustrator** program actually allows the user to draw pictures,
- that **Word** actually formats documents,
- that **PowerPoint** actually makes slide shows, and
- that **Universal Translator** actually translates.

One Key Difference, Cont'd

The SW manufacturers refuse to make these guarantees, because they are not required to by law, as are appliance manufacturers.

Also, customers let the SW manufacturers get away with it.

What manufacturers are not required to do, they do not do, and the customers suffer.

Another Key Difference—Liabilities

Another key difference is the difference in liability borne by the producers of appliances and SW.

Appliance manufacturers are liable for damages caused by correctly used or malfunctioning appliances.

Another Key Difference, Cont'd

SW producers disclaim almost all liability in their shrinkwrapped licenses, accepting liability only up to the cost of the SW (i.e., a refund).

Thus, SW developers do not have to be as careful with their mass-market products as appliance manufacturers do.

Warranties

We examine the warranties supplied with the SW products and the appliances.

SW Warranties

Adobe's and Microsoft's End User License Agreement (EULA) are almost identical. Therefore, only one is quoted here.

Adobe's EULA says:

5. Limited Warranty. Adobe warrants to you that the Software will perform substantially in accordance with the Documentation ...

... for the ninety (90) day period following your receipt of the Software.

[missing details dealing with fonts that are translated to other formats; the warranty does not apply to these other formats.]

To make a warranty claim, you must return the Software to the location where you obtained it along with a copy of your sales receipt within such ninety (90) day period. If the Software does not perform substantially in accordance with the Documentation, the entire and exclusive liability and remedy shall be limited to either, at Adobe's option, the replacement of the Software or the return of the license fee you paid for the Software.

ADOBE AND ITS SUPPLIERS DO NOT AND CANNOT WARRANT THE PERFORMANCE OR RESULTS YOU MAY OBTAIN BY USING THE SOFTWARE OR DOCUMENTATION. THE FORGOING STATES THE SOLE AND EXCLUSIVE REMEDIES FOR ADOBE'S OR ITS SUPPLIER'S BREACH OF WARRANTY. EXCEPT FOR THE FORGOING LIMITED WARRANTY, ADOBE AND ITS SUPPLIERS MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AS TO NONINFRINGEMENT OF THIRD PARTY RIGHTS, MERCHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE.

Some states or jurisdictions do not allow the exclusion of implied warranties or limitations on how long an implied warranty may last, so the above limitations may not apply to you. To the extent permissible, any implied warranties are limited to ninety (90) days. This warranty gives you specific legal rights. You may have other rights which vary from state to state or jurisdiction to jurisdiction. For further warranty information, please contact Adobe's Customer Support Department.

This package contains software (“Software”) and related explanatory written materials (“Documentation”).

Substantial Compliance

Adobe Illustrator 7.0 and Microsoft Office '97 come with reasonably good, descriptive manuals describing some typical scenarios the users might wish to do.

Therefore, it might appear that the SW is being warranted to behave as the manual says it does.

However, the warranty specifies only *substantial* compliance with the written documentation, not complete compliance.

Substantial Compliance, Cont'd

Who decides how much compliance is substantial enough?

In addition, it might be that the SW can do *all* the scenarios that are described in the manual, as these were the test cases.

Certainly the developer had to get these examples running to get the pictures of the screen that are shown in the manual.

However, the SW does nothing more general, because the manual describes *all* the test cases.

Substantial Compliance, Cont'd

In other words, the documentation means only what it says and not what the average reader generalizes it to say.

Substantial Compliance, Cont'd

The only written material I find in many packages these days is a manual describing only installation.

Given the typical EULA as described above, perhaps the producer is warranting only that the installation, and not necessarily the program, will perform substantially, but not necessarily completely, in accordance with the documentation provided.

Substantial Compliance, Cont'd

Of course, there is the help system providing documentation, but if the SW does not run, and the help system does not work, does that mean that the SW is effectively not documented or that if the user cannot get to the documentation, any behavior is allowed for the SW because it is undefined in the documentation?

SW Warranty Next to Useless

Clearly, the warranty accompanying SW is next to useless except for getting one's money back if the SW does not work.

Appliance Warranties

The warranty of the Hoover vacuum cleaner says:

Full One Year Warranty (Domestic Use)

Your HOOVER® appliance is warranted in normal household use, in accordance with the Owner's Manual against original defects in material and workmanship ...

... for a period of one full year from date of purchase.
This warranty provides, at no cost to you, all labor and parts to place this appliance in correct operating condition during the warranted period.

This warranty applies when the appliance is purchased in the United States including its territories and possessions, or in Canada, or from a U. S. Military Exchange. Appliances purchased elsewhere are covered by a limited one year warranty that covers the cost of parts only.

This warranty does not apply if the appliance is used in a commercial or rental application.

Warranty service can only [sic] be obtained by presenting the appliance to one of the following authorized warranty service outlets. Proof of purchase will be required before service is rendered.

1. Hoover Factory Service Centers.

2. Hoover Authorized Warranty Service Dealers (Depots).

[details on servicing omitted]

This warranty does not cover pick up delivery, or house calls; however, if you mail your appliance to a Hoover Factory Service Center for warranty service, transportation will be paid one way.

While this warranty gives you specific legal rights, you may also have other rights which vary from state to state.

Full Warranty for Appliances

The contrast is striking. For the vacuum cleaner, I got a full, unlimited warranty, and I did not need it.

Moreover, I still have a fully functioning vacuum cleaner.

Limited Warranty for SW

For Illustrator, I got a limited warranty, and needed a full warranty, as the limited warranty did not provide a useful remedy.

A new copy would behave as the one I had and my money back would leave me with no Illustrator.

Another Appliance Warranty

For Sharp microwave ovens:

SHARP LIMITED WARRANTY

Consumer Electronics Products

Congratulations on your purchase!

Sharp Electronics of Canada Ltd. (hereinafter called “Sharp”) gives the following express warranty to the first consumer purchaser for this Sharp brand product, when shipped in its original container and sold or distributed in Canada by Sharp or by an Authorized Sharp Dealer:

Sharp warrants that this product is free, under normal use and maintenance, from any defects in material and workmanship. If any such defects should be found in this product within the applicable warranty period, Sharp shall, at it's [sic] option, repair or replace the product as specified herein.

This warranty shall not apply to; [sic]

(a) Any defects caused or repairs required as a result of abusive operation, negligence, accident [sic] improper installation or inappropriate use as outlined in the owner's manual;

(b) Any Sharp product tampered with, modified, adjusted or repaired by any party other than Sharp, Sharp's Authorized Service Centres or Sharp's Authorized Servicing Dealers;

(c) Damage caused or repairs required as a result of the use with items not specified or approved by Sharp, including but not limited to, head cleaning tapes and chemical cleaning agents.

(d) Any replacement of accessories, glassware, consumable or peripheral items required through normal use of the product, such as earphones, remote controls, AC adaptors, batteries, temperature probe, stylus, trays, filters, etc.

(e) Any cosmetic damage to the surface or exterior that has been defaced or caused by normal wear and tear.

(f) Any damage caused by external or environmental conditions such as liquid spillage or power line voltage, etc.

(g) Any product received without appropriate model and serial number identification and/or CSR markings.

(h) Any consumer products used for rental or commercial purposes.

Should this Sharp product fail to operate during the warranty period, service may be obtained upon delivery of the Sharp product together with proof of purchase to an Authorized Sharp Service Center or an Authorized Sharp Servicing Dealer.

[details on servicing omitted]

This warranty constitutes the entire express warranty granted by Sharp and no other dealer, service center or their agent or employee is authorized to extend, enlarge or transfer this warranty on behalf of Sharp.

WARRANTY PERIODS

...

Microwave Oven

2 years (magnetron 3
additional years part
warranty only)

...

Full Warranty

Basically, for appliances, manufacturers warrant that there are no defects, that the appliance behaves as it is specified, and that they will make the appliance run if the customer finds a defect within the warranty period.

Liability

We examine the liabilities borne by the producers of the SW products and the appliances.

Appliance Liability

Appliance manufacturers are held liable for damages caused by their appliances, e.g., if an appliance blows up, catches fire, etc.

If it can be shown that the manufacturer failed to apply accepted quality control procedures for the engineering disciplines involved in the manufacture, the manufacturer can be judged willfully negligent and can be assessed punitive damages.

Appliance Liability, Cont'd

Consequently, an appliance manufacturer applies whatever methods are available for predicting behavior and assuring quality of its products, including testing and modeling.

It also arranges for independent verification and validation (IV&V), for example, by the Underwriters' Laboratory, as part of the process of determining the cost of its liability insurance.

Appliance Liability, Cont'd

The Hoover vacuum cleaner warranty has *no* limitation of liability whatsoever. The Sharp microwave oven warranty has a limitation of liability.

To the extent the law permits, Sharp disclaims any and all liability for direct or indirect damages or losses or for any incidental, special or consequential damages or loss of profits resulting from a defect in material or workmanship relating to the product, including damages from loss of time or use of this Sharp product. Correction of defects, in the manner and period of time described herein, constitute complete fulfillment of all obligations and responsibilities of Sharp to the purchaser with respect to the product and shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise.

Sharp Limitation Not Legal

In many places, the law does not permit Sharp to disclaim all liability, particularly of damages or loss caused by a functioning or malfunctioning product.

In other words, if a correctly used microwave oven explodes, Sharp is liable for the damages and loss caused by the explosion.

Note that the “to the extent the law permits” is a recognition of this fact.

SW Liability — None

SW developers suffer no such liability.

There are few laws specifying their liability.

Furthermore, they usually write into their shrinkwrap, mass market licenses a disclaimer for liability for damages beyond the cost of the SW itself.

Adobe's EULA shouts out a very strong limitation on liability; Microsoft's EULA has a very similar shouted limitation on liability.

6. Limitation of Liability. IN NO EVENT WILL ADOBE OR ITS SUPPLIERS BE LIABLE TO YOU FOR ANY CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES, INCLUDING ANY LOST PROFITS OR LOST SAVINGS, EVEN IF ADOBE REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY THIRD PARTY. Some states or jurisdictions do not allow the exclusion or limitation of incidental, consequential or special damages, so the above limitation may not apply to you.

Limitation Not Illegal

In most jurisdictions, the producer has no liability whatsoever for any damages caused by the SW's inability to do its function or for any damage done by malfunctioning SW.

Consumers accept

1. the useless warranty and the limitation of liability and
2. the poor quality SW

They keep paying for upgrades, which are often little more than corrections of flaws in a product that they already paid for.

Mass-Market vs. Bespoke Software

All this is about consumer SW developed at a producer's own expense and risk for the mass market.

For bespoke SW, esp. systems with high reliability and safety concerns, e.g., in aircraft, automobiles, telecommunications, and process control, ...

the producer warrants the product and is subject to liability
...

as a result of the contract negotiated face to face between the client and producer.

Negotiating Power in Bespoke SW

For bespoke SW, the client has power to force the producer to warrant the product and accept liability.

The client can always go to another producer.

Negotiating Power in Consumer SW

In consumer market, in which there is no face-to-face negotiation of a contract, a contract warranting nothing and limiting the producer's liability is foisted on the consumer through the shrink-wrap mechanism.

For a given function, there is often only one product that runs on a customer's system or that all those interacting with the customer can use.

Thus, the customer is forced to accept this product and its license.

Negotiating Power in Consumer SW, Cont'd

The producers have power to force consumers to accept an agreement that strongly favors the producers.

This imbalance of power is probably the reason that consumers accept poor quality SW and the unfavorable terms of the shrinkwrap consumer SW license.

QA Methods and Warranties and Liabilities

In a number of engineering disciplines, there are systematic and sometimes formal procedures for verification and validation that are to be followed while the product is in design stage.

Electrical & Civil Engineers & Architects

Electrical engineers routinely apply mathematical models of electronics to determine if their designs will function correctly and will meet safety requirements.

Civil engineers and architects routinely apply mathematical models of structures to verify that the structures they are designing will support the load to which they will be subjected and that they will withstand the environmental forces that may push on them.

Why do QA?

The reason that these engineers routinely apply their quality assurance (QA) procedures is that ...

if they do not and the product does not work as it is supposed to, their employers may be inundated by customer complaints, may suffer massive returns with refunds, and may, in the worst case, be sued for damages.

Why do QA?

The employers may then take disciplinary and, in some cases, job action against the engineers responsible for the malfunctioning product.

Also, if these engineers do not apply their QA procedures and the product causes damages, the failure to apply the QA procedures in the construction of the product may subject the manufacturer to a negligence claim and punitive damages beyond the just the base cost of the damages.

Establish QA Procedures

In these engineering disciplines, the manufacturers establish procedures to be followed during design, development, and manufacturing.

These procedures include a variety of tests, ranging

- from inspection of documents,
- through actual usage of prototypes of and samples of the developed products,
- to exercising mathematical models.

Establish QA Procedures, Cont'd

The manufacturers require employees to follow these procedures and to document that they have followed the procedures.

The documentation may be subpoenaed in a damages lawsuit.

Failure to follow these procedures subjects the offending employee to disciplinary action and, in some cases, job termination.

QA Procedures vs. Negligence

These procedures and penalties for failure to follow the procedures is the manufacturer's best defense against a negligence claim.

Physicians

The professional requirements for a medical doctor or physician are instructive.

A physician is held to *the standard of care* (SoC) in his or her community.

Failure to provide at least the current SoC may subject the physician to a negligence complaint and to malpractice action.

Definition of The SoC

The definition of the SoC varies and depends on

1. what is taught at medical school,
2. the results of recent medical research, and
3. what the physicians in the community regularly do, given the resources available.

Definition of The SoC, Cont'd

The community SoC is determined case-by-case in malpractice cases from the testimony of expert witnesses, usually other physicians.

In medicine, the SoC for a community is a baseline and may not be all that close to the state of the medical art.

The SoC consists of what the doctors in the community consider to have been demonstrated as effective treatment, modulo the facilities and resources available to carry it out.

Definition of The SoC, Cont'd

It is not required for a physician to apply the latest treatments, which may be only experimental

But, it is not an acceptable defense in a malpractice suit to say that the applied out-of-date treatment is what the physician learned in medical school.

Definition of The SoC, Cont'd

The physician is required to keep up to date and learn demonstrably effective new treatments against diseases in his or her specialty.

The SoC for a community evolves continually with new treatments established by research as effective.

Negligence

Anyone with a duty to be careful in a treatment is considered negligent and is liable for damages if

- he or she has not applied the accepted SoC,
- the care causes damages, and
- there was no independent, intervening cause of the damages.

The SoC is higher for a relevant professional than for others.

Negligence & Professional Malpractice

For a non-physician, the SoC for medical treatment is what the reasonable person-in-the-street would do in the circumstances.

For the professional physician, not to apply the community's SoC for physicians is considered malpractice.

New Treatments

In medicine, the SoC does not require using not-yet-widely used treatments and, in fact, may require *not* using them, especially if they are as yet unproved.

However, in other areas, one might be expected to use a new technology even it is not yet widely used.

In such a case, the SoC drives adoption of new techniques.

New Technology

There was a famous case from the 1920s or 1930s in which the operators of a tugboat, the *T. J. Hooper*, were held liable for the boat's sinking in a storm because there was no radio on board with which to listen to weather reports.

The operators were held liable even though, at the time, most boats did not have radios.

This case spurred the adoption of radios as standard equipment on board boats.