# Why computers of the next digital age will be invisible

*By Tom Chatfield - 4th December 2013*

**Computers are hi-tech, right? Our children may not see it that way. The next generation of digital devices will be hidden, says Tom Chatfield, bringing both benefits and dangers.**

The author Douglas Adams once made a witty point about technology: the inventions we label "technologies" are simply those which haven't yet become an invisible, effortless part of our lives.

"We no longer think of chairs as technology," he argued. "But there was a time when we hadn't worked out how many legs chairs should have, how tall they should be, and they would often 'crash' when we tried to use them. Before long, computers will be as trivial and plentiful as chairs…and we will cease to be aware of the things."

Adams's prediction was prescient. Computers have been such a prominent, dazzling force in our lives for the past few decades that it's easy to forget that subsequent generations might not even consider them to be technology. Today, screens draw constant attention to themselves and these high-visibility machines are a demanding, delightful pit into which we pour our waking hours. Yet we are on the cusp of the moment when computing finally slips beneath our awareness – and this development will bring both dangers and benefits.

Computer scientists have been predicting such a moment for decades. The phrase "ubiquitous computing" was coined at the Xerox Palo Alto Research Center in the late 1980s by the scientist Mark Weiser, and described a world in which computers would become what Weiser later termed "calm technologies": unseen, silent servants, available everywhere and anywhere.
Although we may not think about it as such, computing capability of this kind has been a fact of life for several years. What we are only beginning to see, however, is a movement away from screens towards self-effacing rather than attention-hungry machines.
Take Google Glass. Recent news stories have focused more on intrusion than invisibility. (There's even a young word, "Glassholes", describing the kind of users who get kicked out of cafes). Beyond the hand-wringing, though, Glass represents the tip of a rapidly-emerging iceberg of devices that are "invisible" in the most literal sense: because a user's primary interface with them is not through looking at or typing onto a screen, but via speech, location and movement.
This category also includes everything from discrete smartwatches and fitness devices to voice-activated in-car services. Equally surreptitious are the rising number of "smart" buildings – from shops and museums to cars and offices – that interface with smartphones and apps almost without us noticing, and offer enhancements ranging from streamlining payments to "knowing" our light, temperature and room preferences.

**Intelligent cloud**

The consequences of all this will be profound. Consider what it means to have a primarily spoken rather than screen-based relationship with a computer. When you're speaking and listening rather than reading off a screen, you're not researching and comparing results, or selecting from a list – you're being given answers. Or, more precisely, you're being given one answer, customized to match not only your profile and preferences, but where you are, what you're doing, and who with.

Google researchers, for example, have spoken about the idea of an "intelligent cloud" that answers your questions directly, adapted to match its increasingly intimate knowledge about you and everybody else. Where is the best restaurant nearby? How do I get here? Why should I buy that?

Our relationships with computers, in this context, may come to feel more like companionship than sitting down to "use" a device: a lifelong conversation with systems that know many things about us more intimately than most mere people.

Such invisibility begs several questions. If our computers provide such firm answers, but keep their workings and presence below our awareness, will we be too quick to trust the information that they provide – or too willing to take their models of the world for the real thing? As motorists already know to their cost, even a sat-nav's suggestions can be hopelessly wrong.

That's not to mention the potential for surveillance. More than a decade ago, critics of ubiquitous computing suggested it is "the feverish dream of spooks and spies – a bug in every object". Given this year's revelations about the NSA monitoring our communication, it was a prescient fear, and one that has had recent commentators reaching for that familiar adjective "Orwellian."

There are, of course, causes for celebration about this technology too: hopes for a world in which computers, like chairs, simply support us without draining a particle more of our time, attention or effort than required. And in any case, subsequent generations may not share the same concerns as us. As Douglas Adams put it, everything that already exists when you're born is just normal – but "anything that gets invented after you're 30 is against the natural order of things and the beginning of the end of civilization as we know it."

Yet as computers slip ever further beneath our awareness, it is important that we continue to ask certain questions. What should an unseen machine be permitted to hear and see of our own, and others', lives? Can we trust what they tell us? And how do we switch them off?

Invisible computers are here. But we must remember to keep at least some of their facets within sight.

**Comprehension Questions:**

1. According to the author, what was Douglas Adams's point about technology?
2. What does the term "ubiquitous computing" refer to?
3. Give an example of a device mentioned in the text that represents the trend towards invisible technology.
4. How does the author describe the consequences of having a primarily spoken rather than screen-based relationship with a computer?
5. What concerns does the author express about the potential for surveillance in the age of invisible computing?

**Multiple Choice Questions (MCQ):**

6. According to Douglas Adams, when do we stop considering something as technology?
   a. When it becomes invisible and effortless b. When it becomes expensive c. When it has many features d. When it is difficult to use

7. Who coined the term "ubiquitous computing" and where was it coined?
   a. Douglas Adams, at a technology conference
   b. Google researchers, during a press conference
   c. Tom Chatfield, in a book on futuristic technology
   d. Mark Weiser, at the Xerox Palo Alto Research Center

8. What is the primary interface for devices like Google Glass and smartwatches?
   a. Typing onto a screen b. Speech, location, and movement c. Reading off a screen d. Touch gestures on a screen

9. According to the text, what is the potential downside of having computers provide firm answers while keeping their workings invisible?
   a. Increased trust in information
   b. Overreliance on inaccurate information
   c. Improved decision-making
   d. Limited surveillance capabilities

10. What does the author suggest is important as computers become more invisible?
    a. Trusting them completely
    b. Continuing to ask questions about their impact
    c. Ignoring their presence
    d. Allowing them to control every aspect of our lives

**Expression**

11. Share your perspective on the idea of computers becoming as trivial and plentiful as chairs, as mentioned by Douglas Adams.

12. Discuss the potential benefits and dangers of invisible computing, as presented in the text.

13. How might a primarily spoken relationship with computers impact the way we interact with technology and receive information?

14. Analyze the comparison made between invisible computers and surveillance, highlighting the concerns raised by the author.

15. In your opinion, what questions should society ask regarding the use of invisible technology, and why are these questions important?