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AutoCAD® 2008 Productivity Study

White paper to guide AutoCAD customers in making an upgrade decision

for Autodesk®

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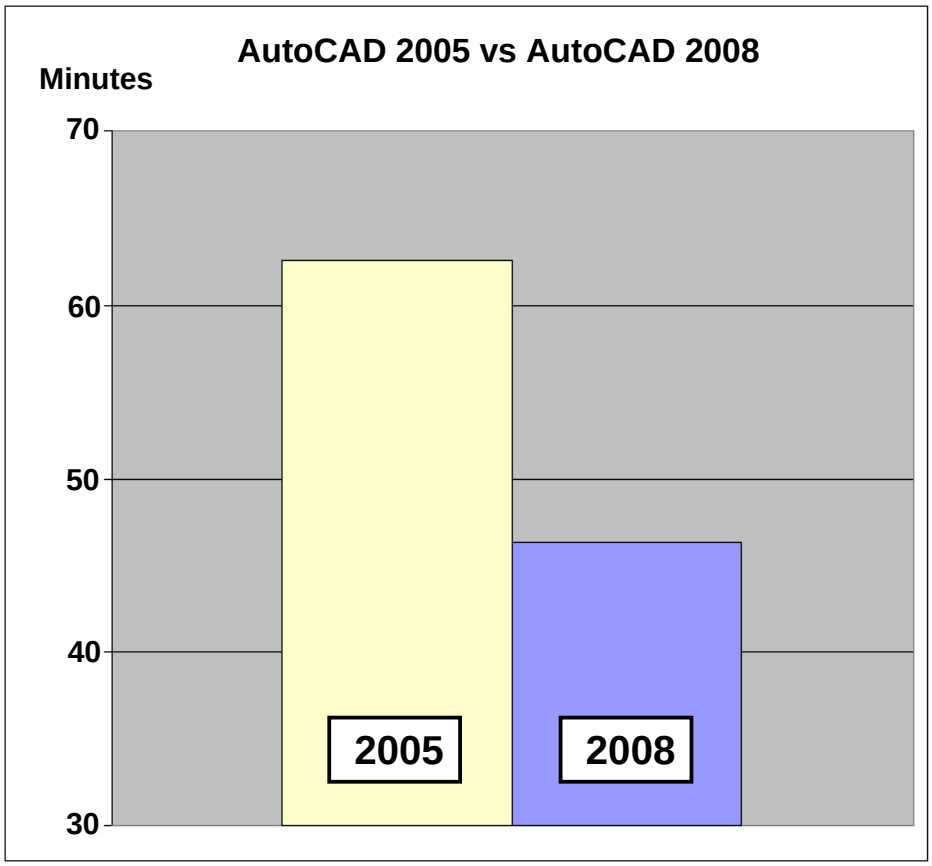
AutoCAD 2008 makes architects 26% more productive
A little training brings even more rewards

CAMBRIDGE, UK – How much will you benefit from upgrading to AutoCAD 2008? Cambashi, an independent consulting firm, compared architects using AutoCAD 2008 against those using AutoCAD 2005 for a typical design documentation exercise.

The findings were clear:

- AutoCAD 2008 is significantly more productive. On average, architects using 2008 completed the exercise 26% faster than those using 2005.
- Training makes all the difference – AutoCAD 2008 users who invested time in a short period of training were substantially faster.

So, how much more productive can you expect to be? To find out more, read on.



Clear result: Architects using AutoCAD 2008 completed an identical exercise 16 minutes faster, on average, than their 2005 counterparts.

Design exercise

The comparison was achieved by timing architects as they worked through a typical architectural documentation exercise. The test consisted of design documentation tasks that architects perform everyday. It met client criteria to minimise time and effort during building construction through less ambiguous architectural instructions.

Our exercise enabled the participants to make use of specific new AutoCAD 2008 productivity features.

> ***Participant quotes:***
>
> *"We use layouts all the time -- the productivity improvements are fantastic."*
>
> *"Copying and dragging tabs is a real bonus"*

The test was developed in partnership with award-winning architects Annand & Mustoe, and was based on their design for a University research institute.

The exercise (full details in the Appendix) was based around the creation and manipulation of several layouts derived from a Library floor plan. Typical tasks included manipulation of layouts, annotation scaling, dimensioning, text manipulation, tables and data extraction.

Before and after: This part of the exercise involved annotation of the furniture using common AutoCAD tools

Participants

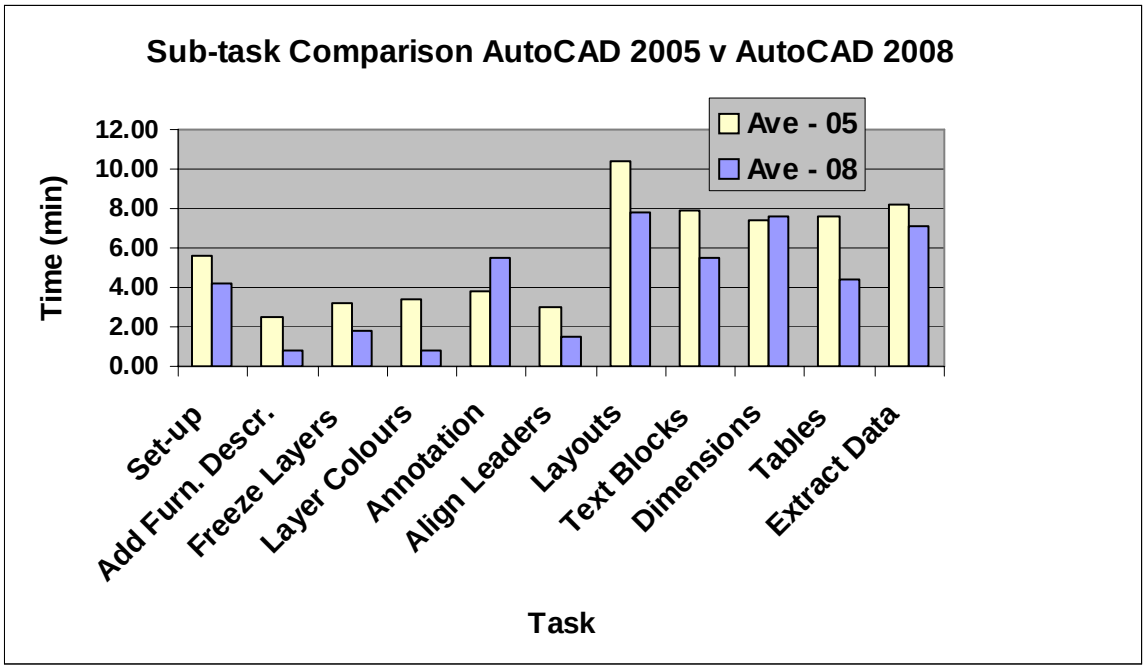
The ten AutoCAD 2005 users and ten AutoCAD 2008 users were working architectural professionals from around the UK, including architects, architectural technicians, CAD Managers, furniture contractors and suppliers.

We asked a group of experienced AutoCAD 2005 users to use the existing software and another group, who had previously had access to a beta version of 2008, to make identical changes using 2008. Of this last group half had a brief period of self-training and half went straight into the exercise.

> ***Participant quote:***
>
> "*Direct access to scale is incredibly useful -- I really like that.*"

Results in more detail

We found that AutoCAD 2008 users completed an identical documentation exercise on average 26% faster than AutoCAD 2005 users. The exercise was made up of 11 sub-tasks. Timings were taken for each of the individual sub-tasks as well as the overall exercise. The chart below shows how 2008 and 2005 users compared.



2008 versus 2005: 2008 users were quicker on almost every task

Big wins

AutoCAD 2008 is a major productivity release. There are several changes to the user interface that give users direct access to features such as View Port and Annotation scale which, apart from significantly reducing the number of mouse movements and clicks, enhances the whole user experience.

> ***Participant quotes:***
>
> "*Being able to change annotation scale globally will save days -- in the past we would have had to make hundreds of individual changes."*

Several new features stood out as providing the greatest gains for 2008 users. New layer management facilities delivered a **75% improvement** overall. The ability to manipulate layer properties independently in different layouts also proved a major benefit. New improvements to dimensioning and multi-leader alignment also proved valuable.

> ***Participant quotes:***
>
> "*Being able to change layer colours separately is a huge bonus for us.*"
>
> "*We use colour tables to change line weight.*"

In the past AutoCAD included simple links to spreadsheets. As architects increasingly control specifications and design rules with spreadsheets, bi-directional links become more important. Consequently the exercise made use of AutoCAD 2008's new 'intelligent' links to spreadsheets and the ability to extract data automatically from specific drawing entities to tables (eg. polylines).

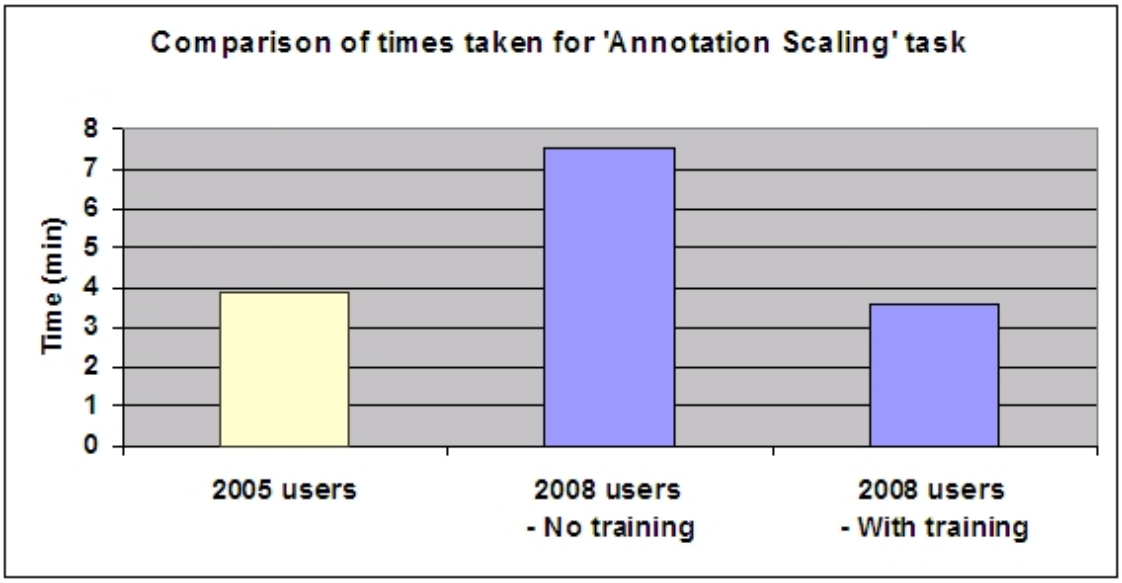
Data extraction from drawing entities is particularly powerful. A few simple selections from entity lists yield lengths and quantities automatically, which would normally take several hours to calculate.

As well as improved productivity these facilities ensure consistency between the tables and the spreadsheets so that, when updated, changes are reflected in both AutoCAD and the tables. This improved consistency and precision enhances the documentation experience and improves the quality of communication of architects' instructions to clients and contractors.

The importance of training

In general, 2008 users showed significant productivity gains for each sub-task. The notable exception was the use of Annotation Scaling, which showed an aggregate slower time for 2008 users over 2005. The test results were examined in more detail, after the testing had been completed, to see if there was any explanation for this poor result for the annotation scaling feature.

The individual test results fell into two clear groups, with one group being more than twice as fast as the other group. After interviewing the test participants, in each of the groups about their performance on the exercise, it became clear that the key factor was how familiar each individual was with the annotation scaling feature prior to performing the test. The customers who had not used annotation scaling prior to the test were in the slower group, the customers who had used the annotation scaling feature, particularly for some real projects, were in the faster group.



This outcome emphasises the importance of training as a key consideration in adopting any new software product. The 2008 users who had done some preparation made real productivity gains. As would be expected, the more time users invested in preparation, the greater the payback.

Discussion

So, you guessed it – there's no great surprise. We found AutoCAD 2008 produces significant results in terms of customer productivity. Commonly, architects are under so much time pressure that they can't risk the slightest disruption to their schedules by upgrading their software. Sometimes they wait for a new project before implementing new software. As a result some users will delay installing the new software until it's more convenient, but this can sometimes take months. When they do finally install the new version, there may be little time to learn the new features.

There are added pressures as new materials and building processes are introduced. These require increased communication and clearer working drawings from architects. They need help to compare the risks of disruption with the rewards of greater productivity. This paper provides pointers to help understand how quickly the costs of upgrading can be recouped.

Training

With training an architect will reach a new productivity level much faster. The payback is proportional to the amount of productivity increase and the time taken to get there. The investment is the time and resources invested to put the new functions into practice in every day work.

It is important to identify the features that will add value and invest a little time in understanding the approach and the new functions before starting work. Any initial drop in productivity is dependent on the speed of the installation, the amount and ease of migrating customisation, the provision of training and the speed of learning.

The gradient of the learning curve depends on factors including how much time is spent using AutoCAD each week, the level of experience as an architect using CAD, and whether it is possible to invest any time learning the new functionality.

One of the most noticeable outcomes of the study was that 2008 users who took the time to familiarise themselves with the new features were almost twice as productive as 2005 users. Productivity gains will inevitably increase with regular use.

What is in it for me?

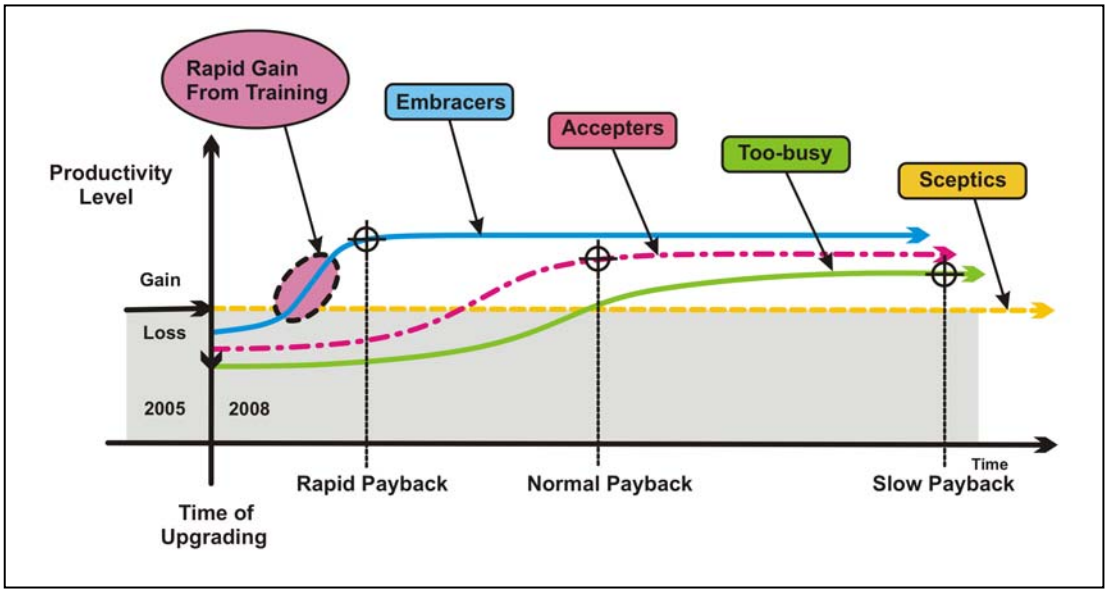
To understand how much more productive you can expect to be, identify yourself from one of the following user types.

User type	Typical upgrade characteristics
"Sceptics"	*Believe what they have is good enough already.*
"Too-Busy"	*Leave the box on the shelf for a few months before finding time to install.*
"Accepters"	*Install on receiving, and possibly make some effort to see what's new.*
"Embracers"	*Proactive users who go on upgrade training courses to learn new features.*

In conducting this study we identified these four upgrade strategies. Each will result in a different response to the upgrade. They are independent of experience level. In fact, some of the most experienced AutoCAD users are the most resistant to change because they are comfortable working in a particular way.

Having analysed the data from a variety of users we know that even relatively inexperienced users find the new 2008 features let them work faster. Using results from the exercise we came up with the following timeline.

Productivity Timeline



The timeline shows the productivity outcomes of each strategy. These responses range from 'Sceptics' who achieve zero change, to 'Embracers' who achieve the maximum gains in the shortest time.

ROI Generator

Take the test! See for yourself how much productivity you can expect to gain. Plug answers to the following four simple questions into the ROI Generator spreadsheet (available as a download) and get an instant appraisal of your expected productivity curve and ROI.

- What is your hourly rate? ($/hour)
- What is your CAD usage level? (< 10 hr/wk, 10 to 20 hr/wk, > 20 hr/wk)
- What is your ability level? (Beginner, Intermediate, Advanced)
- What is your upgrade strategy? (Sceptics, Too-busy, Accepters, Embracers)

Conclusions

Cambashi conducted a fair and independent appraisal of the productivity differences between AutoCAD 2008 and AutoCAD 2005 for a typical architectural exercise. The study had 20 participants, 10 using 2008 and 10 using 2005, from a broad mix of backgrounds and skill levels. Participants agreed that the exercise was a reasonable representation of how architects work on a daily basis.

We believe the reasons for the productivity gains are simple: AutoCAD 2008 has a number of improved features that make common tasks in architectural documentation much easier. These include layout manipulation, annotation scaling, dimension spacing and multi-leader alignment. Effective use of some of these new features, e.g. layout manipulation, needs no training. More advanced features may require some background reading, but often dramatically improve the productivity of the architect. There are a number of upgrade guides and 'Tips and Tricks' documents available. The productivity increase as a result of moderate self-training of around an hour was very noticeable. Significant productivity gains are likely with formal or informal upgrade training.

The level of productivity gain depends on the approach to upgrading. Users who are hesitant and unwilling to learn new features are unlikely to achieve significant improvement in workflow. However, those who spend a short time familiarising themselves with the new features can very quickly achieve large productivity gains of the order of 40 - 60 %.

Correspondingly, the return on investment that can be expected depends on usage level, skill level, upgrade strategy and chargeable rate.

How much is improved client and contractor communications worth to you?

Appendix

The drawing used in the exercise was created by Annand & Mustoe Architects (http://www.amarch.co.uk). A typical floor-plan was chosen from their design for a research institute, to ensure that it could be easily understood by all architects.

Of the 20 participants, most were full-time practising architects. The others were a mix of furniture suppliers, architectural drafters, CAD managers, and landscape designers. These users represented a wide spectrum of ages, abilities and levels of experience.

All of the participants were recruited by calling known AutoCAD users and explaining the purpose of the exercise.

In advance of the exercise, participants were emailed a package of information containing:

- the initial drawing file
- a set of general instructions for the exercise
- a test result drawing file

The exercise was an accurate reflection of the design tasks architects typically undertake on a daily basis. Where possible it made use of new AutoCAD 2008 features.

The exercise was made up of 7 principal tasks (4 had 2 parts, yielding 11 sub-tasks):

No.	Task	2008 features used
1	Setting up and manipulating 4 layouts to particular sheet sizes and scales	Excel functionality for copying and manipulating layout tabs
2	Freezing specific layers on specific layouts and changing the colour of items in individual layers	The ability to freeze individual layers and change entity colours on individual layers
3	Adjusting text and leaders in certain layouts	Annotative text and scale
4	Aligning text and leaders and importing furniture descriptions	Align multi-leaders
5	Importing and manipulating text blocks	Enhanced spell checker and ability to put text into columns
6	Creating and manipulating dimensions	Dimension spacing command
7	Setting up a table from a spreadsheet and extracting data to a table	Excel links and data extraction from drawing entities, eg. polylines

Cambashi monitored half of the exercises in face-to-face sessions. The remainder were conducted remotely, monitoring activity with web conferencing software. This enabled every action of each participant's CAD screen to be observed and measured as they

worked through the exercise. At all times a simultaneous audio link was maintained so that comments and questions could be dealt with instantly.

The overall time and the individual times for each task were recorded using a stopwatch. In addition, at the end of the exercise, participants were asked for feedback on the exercise. All completed drawings were collected and archived for analysis and future reference.