EDUCATION AND TRAINING FOR THE FUTURE

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Introduction

I do not have the panacea for the training needs for the next millennium. Nor do I want to hark back to the good old days of education. Times have moved on and so should our education and training methods and so what I hope to achieve in this talk is to put forward some views, provoke some thoughts and ideas and to offer some examples and suggestions.

History

We can learn from the past without mimicking it and so I want to look back for a moment to remind ourselves of the way our predecessors undertook to train their work force. Before the first world war (my pre-history starts there!) youngsters were apprenticed to a Master baker, they learnt a skilled trade by observation and practice. In those days the pressures on time were less. As the work force moved from the land into the cities so there was a need to formalise and speed-up the training so that more food - in our case bakery products - was available. City & Guilds Qualifications were born and by the 1950ís it had become the gold standard for bakery training with increasingly higher levels of craft and technological qualifications leading to the Full Technical Certificate which combined product knowledge with bakery management. The qualifications married both classroom teaching and workplace practice. In the late 60ís and 70ís the numbers of plant bakeries were increasing and fewer bakers were needed to feed the population. At the same time the education system opened its doors to the majority rather than the privileged or brightest few, with much more choice of course and careers available to potential students.

It was at this time that the baking industry perhaps failed to react quickly enough and adapt to changing industry demand and standards for bakery training started to fall away. Because youngsters had far more choice of career the baking industry had to compete with other more glamourous opportunities. In the 90ís the government, faced with this sort of dearth of skills in many areas, not just baking, and wishing to broaden the education of school leavers not destined for University education introduced NVQs and Modern Apprentice-ships and pushed funding to support this form of education. And so we arrive at the current situation - a falling entry level to bakery colleges and few truly skilled bakers with a thorough understanding of the science, technology and craft of baking.

So how might we provide a trained workforce to meet the demands of the 21st Century so that we can tempt and delight our customers with the wonderful products that come from a bakery - whether that be a small craft baker or a plant baker.

As my boss is always telling me, look at and decide the end product you want to make and then consider the options for achieving that product.

So what do we want a training to achieve - it needs to give the trainee baker -

* a thorough understanding of the products and how those products are made

* an understanding of the ingredients contribution to the product

* an understanding of the process contribution

* practical skills - e.g. mixing dough correctly and under-standing when a dough is proved

* production skills - e.g. scheduling

* troubleshooting skills e.g. rectifying problems when they occur

* commercial skills - encompassing computer, marketing, management, financial skills etc,

* resource skills - encompassing workforce and customer interactions

These are all important and can be achieved using different tools at different stages of the training cycle.

Such training is not a one-off and must continue through the career of the individual.

Teaching per se is not always training. Teaching is a necessary adjunct to training and training can only be accomplished when the taught material is put into practice.

Only when this taught material is understood and applied effectively can the student be said to be trained and become educated in the chosen field.

I want to start by briefly looking at how the conventional bakery courses relate to the modem working environment. In the vast majority of bakeries around the world, bulk fermentation is not used as a processing method and yet course material is still often weighted towards this process. Today no-time dough production is the norm (by the term no-time dough I mean use of mixers such as spirals or high-speed mixers). How many courses include details of plant production technology in their teaching materials? The equipment used in commercial operations is more sophisticated and is continually being improved by the equipment manufacturers. There are very few courses, which have the luxury of state-of-the-art equipment and can teach their use. The raw ingredients used are claimed to make our lives easier but how many of us know exactly what is in that improver formulation and how it might affect or be affected by other ingredients. There is a constant need for up-to-date information as and when it is needed. This is more difficult to give by traditional classroom methods as it requires the information source - i.e. the college course material to be instantly accessible and up to date.

However the current basics of ingredients and processing can, if the teachers are well trained, be taught in a college environment or in an NVQ course where the course material (workbooks etc) is well planned and up-to-date. The advances in

ingredients and equipment can be added to the training portfolio in ways I shall come onto later.

It is very difficult for the college lecturers to keep abreast of changes - there is no mechanism in place for them to get this additional training.

Perhaps we need to use other means along with conventional teaching and 50 I now want to look at what new technologies can offer. I'll look first at the been around for a while, but untapped sources and then come on to the very new sources.

Computer programs are available to help both trainee and experienced baker to develop new products. Some colleges use them and many companies use them to help their bakers and product developers in effective working. One such system is the CCFRA Cake Expert System - a 3 module system for cake product development, shelf life prediction and troubleshooting. The cake product can be developed initially at the PC, the ingredient quantities can be checked against the rules of cake making and the mould-free shelf life can be predicted. HELP is available at the touch of a button for explanation and reinforcement of information learnt in training. Images are available to show the trainee what happens when the rules of cake making are broken. Such programs contain a wealth of knowledge that can be tapped as and when it is needed. The knowledge is structured to help the trainee consider the functionality of the ingredients in the cake product under development.

And when the theoretical cake is ready and has been taken to the test bakery, found perhaps not to perform exactly as required, then the quality of the cake can be described to the diagnostic module where help is available for the processing of the product.

When things go wrong and faulty products result, the classical remember and reason method was often used for problem solving and so one consulted one's mobile information base - the brain - and hunted through the facts stored there, and used deductive reasoning powers contained therein to come up with a solution to the problem. This method is fine if you have a lot of material stored away and your own information retrieval is efficient. In computer systems like this one for Hot X Buns, the information base never forgets, nor gets tired. It wont contain absolutely every solution (what human can?) but it offers suggestions and will rigorously hunt through its knowledge base. Systems such as this can be used as on-the-job training tools or can be used in conventional courses to allow experimentation and to reinforce course materials.

There could be many programs of this nature, which would contribute to the training. For example, a yeast level/proof time/proof temperature calculator which the student could employ to look at possible changes in proof to meet a changed schedule in the bakery.

Keeping information and knowledge up-to-date is a never- ending task. So how might we achieve that using new technologies? One vehicle for this might be the WEB. A load of rubbish do I hear you cry - yes, in many cases the bakery technology information found on the internet is just plain wrong! The sources of such information

are not always creditable, but for today's generation of youngsters - the `Klick Kids - it is one of the first stops made when they are seeking information.

This new technology also offers an opportunity to access a wider range of knowledge and information at your workplace - not only for your current production needs but also for future needs. This could be done using on-line Advisors or other software tools.

Imagine having access to an Advisor which can feed information about the technology of bread making in a form that is appropriate to your needs. It might be used as a what-if tool enabling you to pose, for example, changes to your processing conditions and offer advice on whether they might work for the product you describe. Or it could be used to troubleshoot your product faults.

Or if you want to query it about making a certain product using a different processing method it could give you information built up from its knowledge sources in relevant bite- sized chunks with links to more complex information for the user who needs to look deeper. Such information could also be linked to equipment or ingredient specifications from reliable sources.

Virtual reality baking has its place to stimulate and show in an easily absorbed way what happens in a bakery. But the baker still needs the sight, smell and touch of the dough and all the messages that these senses send to the brain - the craft skills need to be integrated - they play an important part in completing the bakers roundness and soundness of education.

However modern production techniques and speed of operations often conspire to stifle this ability e.g. bulk quantity of dough processed in the plant environment, or scheduling and cost pressures in the store bakeries.

Computer programs e.g. BALANCE module of the Cake Expert System 1 described earlier can go some way towards creating the visual and auditory links and, maybe the smell/aromas will one day be generated by computer. After all, in York you get some very interesting smells at the Yorvic exhibition and any one who has visited any of the Walt Disney facilities will understand the power of 3D projection. The airline industry has used such virtual reality systems for years to help its pilots along the way to becoming trained aircraft flyers.

The development and use by the industry of new computing technology systems are essential if the industry is not to lag further behind other industries. Only by using them can we discover what the industry needs in tools of this type to improve the training of our workforce. They can be used as support tools to create the trained baker of the future.

To return to the more traditional training, some situations for training require specialist input found from specialist sources provided they are geared to the working environment.

Customised courses which deal in depth with one product type or range e.g. laminated pastry production or for advances in new ingredients/equipment that I

mentioned earlier can help a company quickly and efficiently get the knowledge and practical experience relevant to their products.

Such courses are best planned with the client to meet their training needs. An example of this was the Bakery Manager Focus Programme which was undertaken between Sainsburys, ourselves at CCFRA and Brooklands and Tameside Colleges. Up-to-date and relevant course material along with practical exercises were put together and delivered at 3 different centres across the country at the required level for Sainsburysí Bakery Managers.

We might take a leaf out of the computing industry's book. It has information Days which tell their professionals the directions of innovation. They are often done at supplier expense and can be followed up with hands-on training courses.

Today's Klick kids are used to using different materials from those of their parent's generation just as their parents used different training tools from their parents. In the generations from grandparent to grandchild we have evolved from the sticks and chalk to the calculator through to the computer and mouse. We have also evolved in the way we look for information. We cannot close our minds to new techniques - we have to try them out and see how we can get the most from them. If we as students had never questioned the techniques our parents used our progress would indeed have been slow.

We have to find ways that will stimulate the students - not turn them off - children love to experiment that is why they have no fear at using klick technology. The British Nutrition Foundation (BNF) is developing a computer program for use in schools to help the next generations to understand the technology of cakemaking. The program will be highly interactive and will help students understand the consequences of their actions when ingredients are combined in different proportions. This program is just one of several food-related interactive programs on their Millennium CDROM, a copy of which will be given to every secondary school in the country. We now have a generation of students who are happiest drinking up the knowledge and information that is provided on the Internet.

Some of that information is blatantly wrong - we have a duty to provide the correct knowledge and to relay it in an exciting and informative way. It may be in sound-bite chunks or it may be as moving image or virtual reality.

The challenge is in how we integrate traditional and evolving methods - taking the best and most appropriate from each.

No single technique will do all that we need - it never did.

Now we have a much wider range of tools available to us.

That range will grow - some will fall by the wayside and be replaced with others.

My generation was not really taught to reason at college - we learnt by rote. You only truly learnt to reason when you put into practice what you had been taught. A colleague of mine said he only really understood the link between dough

temperature and yeast level in proof when he wanted to have more drinking time at lunchtime and he quickly learnt that if he was to have the dough ready for the oven he could manipulate the yeast level and the dough temperature- within certain limits - to have that dough ready when the tutor expected it even though he was late for the start of the bread making practical.

The emphasis now has to be in providing meaningful, useful and user-friendly (a much labored term) way in a range of methods - classical teaching (not all students would consider that the classroom was a user friendly!), work shadow, apprenticeship, on-the job software tools, one-to-one guidance. We need to put in place the infra- structure to train the trainers - this has been sorely overlooked in the last decade - our bakery college lecturers have no effective means of updating their knowledge and teaching materials.

We have to provide a mix of solutions to the training needs of the future -just as you have ingredients for a recipe so you have different training techniques which, each in their own way, add the flavour and functionality to the training recipe so that the resulting product is both attractive (tempts the student to buy into) and consistently tastes good (keeps the student buying). We can use traditional classroom teaching using sound technologically advanced material from reliable and authenticated sources - not hand me down information derived like Chinese whispers which get corrupted with each telling.

We can use on-the-job course work and practice such as NVQS, we can incorporate software tools so that the solution to a problem can be available at the touch of a button with support material in the form of video clips, worked examples and visual aids. We can use customised training courses to pass on the specialist evolving knowledge, we can use the Amstar class and the one-to-one sessions. The Open University has used this approach successfully for many years.

However all of these should have some structure. Perhaps a framework has to be put in place on which to hang all of the techniques?

During the last twenty minutes I have put forward some views, hopefully provoked some thoughts and ideas, and offered some examples and suggestions about bakery education and training for the future.

I will end by taking a proverb from an old civilisation - the chinese. It goes: - - - tell me, I forget. Show me, I remember. Involve me, I understand and I would add - because we cannot ever stand still if we want to advance our industry - Combine all this with good new ideas and I have knowledge and am becoming trained.

Thank you