

# Capacity Building for Automated Land Information Systems in Nigeria

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**Keywords:** Education; Land management; training; capacity building; land information systems; computerisation.

## SUMMARY

Current thinking is that the automation of land information systems in Africa could help improve access to land as a resources base and reduce poverty in the region. While this is indeed an ideal and welcome vision, the capacity to cope with this in reality does not quite exist at present. Using Nigeria as a case study, the level of ICT awareness in the land management profession to date is minimal (Kakulu, 2003). Capacity building through training and the provision of necessary infrastructure should occur simultaneously with efforts in this process. In addition, such capacity building should be accelerated to the point where the end-users in various state and local government lands divisions and departments can be part of the systems analysis phases in the development of their systems. This would provide the missing gap in any proposed automation system and guide the product manufacturers in their development of workable GIS and other software programs for use. The paper expresses concern that if an automated system is developed and put in place without sufficient inputs by the recipients and end-users of the finished product, its implementation and use in the future is likely to fail.

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## 1. INTRODUCTION

This paper addresses the need for capacity building to form a vital part of the process in achieving automated land information systems in Nigeria. It focuses on mainstreaming Information and Communications Technology (ICT) into core curriculum and instruction for undergraduates, postgraduate and continuous professional development of the key professionals in land administration in Nigeria. By Automated land information systems, this paper refers to computer based record keeping storage, management and retrieval systems of land and property records.

Land is a natural resource and its potentials may be harnessed effectively where there is proper documentation of title and constant updating of records of ownership and transfers. The level ICT awareness amongst landed property professionals in Nigeria is quite low (Kakulu, 2003) and a recent review of teaching curriculum amongst higher institutions offering estate management in Nigeria including the Nigerian Universities Commission (NUC) minimum standards for environmental sciences, reveals that although ICT courses are provided for, it is in the form of general introduction on an awareness level. With the widespread use and dependence on ICT globally, mere knowledge on an awareness level only is not sustainable as professionals are unable to apply the skills in practice in a meaningful way. Awareness level training in the form of courses offered by service departments is not able to fully address the specific needs of land professionals in a meaningful way.

Computers are perfect tools for working with information and can handle and process large amounts of information for various purposes which would otherwise be difficult to manage manually. It can organize information very efficiently with all content properly identified and indexed making it possible to find whatever is required easily. In terms of speed, computers can perform in minutes, tasks that would take the average human being years to complete. Computers are quite accurate because they are designed to receive information and process such information using a pre-determined sequence stored in a programme thus maintaining a high level of accuracy using the same data repeatedly. They are often quite reliable and dependability is very high.

Although several sectors in the corporate world depend heavily on ICT in their daily operations, land professionals in Nigeria do not seem to be operating at par with their professional counterparts in industry. A number of explanations may be put forward for this, namely:

— Lecturers and tutors responsible for teaching core professional courses in various departments lack the capacity to deliver courses involving ICT to their students.

- Most departments lack dedicated infrastructure in the form of hardware and professional software for use in training
- Curriculum content is heavily dependent on traditional methods of practice which is dependent on manual filing cabinets, notebooks and calculators rather than computer based options.

The result is that students and even adult learners are unable to integrate their ICT knowledge into everyday operations.

The key question is on how automated land information systems can be encouraged or achieved when the end users are not in a position to press for change due to lack of sufficient technical knowledge and exposure. Change then becomes externally induced and therefore faces pockets of resistance some of which might be fuelled by ignorance. In a situation where university graduates also lack the technical knowledge to apply upon graduation and those with the responsibility to train them also lack capacity to do this effectively, then a problem arises. The problem is further aggravated when an uninformed and untrained workforce in both the public and private sector are expected to embrace innovations when their ICT knowledge is either very weak or simply non-existent.

This paper examines the potentials for automated land information systems in Nigeria and suggests the urgent need for capacity building to be given a prominent place in the schemes of change.

## **2. INFORMATION AND COMMUNICATIONS TECHNOLOGY**

A discussion on the automated land information systems in Nigeria would be incomplete without mention of the wider context of Information and Communications Technology. Information Technology (IT), as defined by the Information Technology Association of America (ITAA)<sup>1</sup>, is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." IT deals with the use of electronic computers and computer software to convert; store; protect; process, transmit, and securely retrieve information.

Computers have been around for a while and are currently used by different professionals for a variety of purposes in the execution of their professional assignments. In the field of Environmental Sciences, Quantity Surveyors use software programmes to prepare bills-of-quantities, Architects and Planners use automated computer aided design programmes to produce building designs and layout planning, Land Surveyors use Global Positioning Systems (GPS) to undertake surveys, the list is by no means exhaustive. In Nigeria today, we are all witnesses to the ongoing ICT revolution in the Nigerian banking industry and the change from the use of manual filing and record keeping methods less than a decade ago to

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<sup>1</sup> 18/02/08 [http://en.wikipedia.org/wiki/Information\\_and\\_Communications\\_Technology](http://en.wikipedia.org/wiki/Information_and_Communications_Technology)

automated practice methods. Recently ATM machines have been introduced into the Nigerian banking industry as well. The question to ask regarding the valuation profession in Nigeria is how we have fared, and what our current ICT literacy level and utilization as a profession, is? Are we taking the lead in the construction industry or are we lagging behind in technology?

Dixon (2005) citing Perez (2002) and Gordon (2000) notes that in over hundreds of years, periods have occurred when technological change has brought about radical changes to market boundaries, increasing the scope to exploit intellectual capital. Examples include printing, steam power (including electricity), canals, and railways, mass media, and more recently Information and Communications Technology. Rowlatt et al. (2002) assert that the new economy of the twenty-first century is different from any other new economy, and highlight three main aspects as follows:

- Infrastructure to assemble, analyze, communicate and manage information within “computer mediated networks”.
- Transactions to purchase goods and services carried out through Electronic Data interchange (EDI) or over the internet.
- Interactions transferring information between enterprises or individuals, which add to value.

There have been studies to examine how increasing use of ICT will impact on professional firms’ operations and activities that include productivity, staffing structure and requirements, adoption of working practices, quality of customer service, and importance of a central meeting place have been addressed (Sing, 2005).

### **3. CAPACITY BUILDING NEEDS IN ACADEMIA**

Capacity building needs in some universities and other institutions of learning which offer courses in estate management, land economy or land surveying is threefold.

- Academic staff responsible for teaching core departmental courses who may need to mainstream ICT into various aspects of the syllabus lack the capacity to do so and need to be trained or re-trained to enable them update the course content in such a way that ICT is fully integrated.
- ICT courses are offered to students in a very general way and on an awareness level only. This might have been sufficient in the past when the dependence of the corporate world on ICT was not as high as it is in Nigeria today.
- The applications element where students are introduced to specific professional software and grounded in its use is not very effective due to lack of capacity and professional software developed in line with local practice procedures and methods.
- The method of delivery of ICT as a stand alone subject in most institutions where it is taught by a computer centre or ICT department only and where estate management and other land professionals are taught with students offering different courses with different learning needs makes it impossible to be applications oriented. As a result, students are not able to relate information acquired in a meaningful way.

There is an urgent need for mainstreaming ICT into the core subjects in estate management and other land related courses. By mainstreaming, the ICT component of each course should be taught as part of the particular subject and preferably by the course lecturer or resource person who delivers the course. Separating it in the manner in which it currently occurs may be convenient but discourages lecturers from acquiring new skills which are vital for sustainable development of the estate management and land management profession.

In Nigeria, the National Universities Commission (NUC) is responsible for setting the minimum academic standards and course contents for all degree courses awarded by Nigerian Universities. The NUC approved minimum standards for Environmental Sciences (1989) provides detailed syllabus content for courses in estate management and land surveying. Individual universities may add topics based in their specific focus and area of specialization. The minimum contents of courses in Estate Management were reviewed and suggestions made for mainstreaming ICT into they syllabus for effective learning.

The NUC minimum standard (1989) outlines 14 compulsory core courses which are to be taught in departments of estate management in Nigerian universities as follows:

- 1 Introduction To Estate Management
- 2 Introduction To Valuation
- 3 Principles Of Town And Country Planning
- 4 Taxation And Rating
- 5 Principles Of Valuation
- 6 Land And Resources
- 7 Applied Town Planning
- 8 Arbitration And Awards
- 9 Property Management
- 10 Advanced Valuation
- 11 Feasibility And Viability Appraised
- 12 Estate Development Finance
- 13 Project Dissertation
- 14 Land Economics

Although individual universities may add to this list or provide more detailed syllabus content, the minimum standards have been used as a basis for analysis in this paper. The individual syllabus contents were reviewed for evidence of ICT components within the context of the syllabus and produced the following findings:

- The 5-year BSc programme in Estate Management contains only one course on computer applications which is offered in the second semester of 300 level - more than halfway through the programme. Unfortunately there is no detailed syllabus content for this course within the publication and as such different institutions have over the years, developed their own contents for it.

- Based on the NUC minimum standards, the total number of courses each student is expected to take from first year (100 level) to final year (500 level) including electives, is 73 in all. Out of this total number only one course in computer applications is mentioned. This is considered to be inadequate in a generation that is largely ICT driven.
- Independent departments of Estate Management in universities like the Rivers state University of Science and technology have expanded these minimum standards to three separate courses namely: Introduction to computer science in 300 level which is taught by the Mathematics department, and computer applications to real estate practice which is taught in 400 level thereby increasing the ICT content beyond the minimum standards. In addition individual courses have had their syllabus expanded to incorporate aspects of ICT. Although this is a step in the right direction, capacity building for automated LIS should be the focus of higher institutions and this paper suggests mainstreaming as a workable option.

#### **4. MAINSTREAMING ICT INTO UNIVERSITY CURRICULUM**

To make ICT more relevant, useful, appreciated and easily understood, there is the need to mainstream relevant ICT topics into each particular course where required in such a manner that students can grasp and apply the techniques in a meaningful and sustainable way. A few illustrations on a subject by subject basis could drive the point home further as follows:

- (1) Valuation is a core subject in estate management usually taught as introduction to valuation, applied valuation and advanced valuation. It comprises a lot of mathematical computations and ends with the production of a technical report. The syllabus content could be expanded with ICT components which would incorporate the use of spreadsheets and other mathematical or professional software as part of the instruction and taught by the same lecturer. In addition, the production of the final report and various computer based presentation styles may form part of this course. By so doing, ICT can be mainstreamed into the course in a meaningful way.
- (2) Development Appraisal/Investment Analysis rely very heavily on mathematical computations and manipulation of data in a meaningful way to achieve the desired results. Computers could form the basic teaching tool for this subject by the use of dedicated professional software as well as the adaptation of spreadsheets to suit specific requirements. Where students are taught ICT separately from its use and application it is more difficult to make the connection between both subjects. Development appraisal is usually undertaken in respect of intended capital investments in landed property to determine its feasibility and viability in terms of profitable financial returns to the investor. This process involves extensive mathematical calculations and computations which can discourage Valuers from producing detailed reports. Also, development projects are increasing in complexity in terms of design, construction patterns, funding and cash flow patterns during the life of the investment. Valuers are therefore presented with an extensive number of variables all of which must be considered and evaluated before any meaningful feasibility or viability statement is made. The manual methods

using a simple pocket calculator is unable to cope with calculations of a more complex nature required by banks and other lending institutions.

The use of computers in development appraisal can assist the Valuer in a number of key areas in the process.

- Real life problem situations may be reduced to an organized array of numerical data for input into the system thus compelling the Valuer to adopt more logical and sequential patterns in the conduct of their work.
- The results produced are likely to be more reliable than that produced using a pocket calculator.
- All calculations may be performed automatically and sensitivity analysis may be done on the results so obtained to investigate the effects of possible and foreseeable changes in some of the variables on the ultimate outcome of the investment.
- Weeks and months of lengthy calculations may also be reduced to a matter of minutes.

(3) Property Management courses need to be expanded to include the use of data base management packages such as access or other dedicated software. Students need to be introduced to relational databases and also the role of the internet as a marketing tool in property letting and sales. Teaching of the principles and theory alone without relating it directly to computer applications is not sustainable. Property Management embraces a wide variety of interrelated activities associated with leases. It involves performing certain services on behalf of the property owner such as rent collection, serving of notices to tenants for renewal or termination of leases, negotiation of rent reviews, maintenance inspection schedules, supervision of maintenance work and rates. Property management also involves keeping track of local government levies, rates and other taxes on the property. This process deals with large volumes of data requiring safe and efficient methods of collection, storage, retrieval and manipulation. Property management records need to be updated regularly and proper track of expiry and renewal dates need to be kept. In a large property portfolio such as government records in various ministries, housing authorities or development boards, or even in a small collection of properties managed by a professional firm, there are obvious challenges in property management. Where the volume of property data is high, depending on memory alone might lead to expensive mistakes or only a small number of files may be accessed where decisions have to be made. There may be the inability to remember and prepare for important events such as renewal dates or planned maintenance work which are buried deep within files in a filing cabinet.

- Computer applications to property management can provide the professional property manager with an extremely powerful and flexible information management tool for property management and lease administration. It enables proper documentation of virtually everything about a property. Information about the owners, construction details, photographs, sketches, lease agreement including

financial records of receipts and payments may be made. Information about any property can be called up at any time and in a variety of ways. It can also be programmed with handy reminders – shortlists of which administrative actions are due or are pending at all times reducing the incidence of failing to keep appointments of sending out belated reminders. Apart from the database function, notices and reminders to tenants can be made via the internet and not only by post. This is cost saving and the processes of negotiation for rent renewals may all be properly documented and saved on the computer for future reference. The issue of distance is almost completely removed with ICT. Where Surveyors in the Property Management specialty are sufficiently trained, a computerized approach to property management will assist the property manager as follows:

- Maintain a lively and active property database which would be useful for planning and budget preparation.
- Information may be found whenever it is required.
- It can automatically extract and highlight important dates such as lease renewal dates and also prepare letters, reminders and demand notices.

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Agency practice on the other hand, involves assembling a collection of properties for sale or lease and making this information available to potential buyers or prospective tenants. It is the duty of the Estate Agent to maintain key information about each property within his portfolio which must be readily available to clients. The usual practice is to store such information in a notebook within the office and then the property is advertised by hanging a signboard on it. Potential clients may then arrange a viewing of the property by visiting the office to make an appointment or via telephone calls.

Agency practice may be enhanced by the use of ICT in each step of the process. Property records may be maintained on a database in the office or on an external database where they may be accessed or retrieved when required. ICT is also useful for advertising as the property in question may be advertised on the Firm's website or any other property related websites where it immediately becomes available to the whole world. In terms of viewing, actual physical visits to the site which may be frustrated by distance, traffic jams or inclement weather may be replaced instead with a video of the external and internal views of the property which may be accessed either online, on a laptop or on an office desktop computer.

The above are simple examples of how ICT could be mainstreamed into university curriculum. The most pressing issue in achieving this mainstreaming option is whether academics teaching core courses have the capacity to integrate ICT into their syllabus and teach it effectively. Some form of intervention is certainly required to achieve this because currently, a majority of professional lecturers lack the capacity to do so.

## **5. CAPACITY BUILDING NEEDS IN THE PUBLIC SECTOR**

From the above discussion a conclusion may be drawn that graduates absorbed in the public sector do not possess a strong ICT foundation to enable them embrace ICT. As global concerns heightens as to the need for automated land information systems in Africa and the need for computerized land information systems, capacity building should form one of the most fundamental aspects of this process even in the public sector for very many reasons. The most important reason has to do with the involvement of end users of the computerized LIS in the 'systems analysis' phase. The era of technology transfer has long given way to a more participatory system where the end users of a finished LIS product are able to make

reasonable inputs into the development process. Automation of LIS in Nigeria and Africa should initially be based on the automation of existing procedures for improved efficiency rather than the introduction of completely new processes and procedures that may face stiff resistance to change from the beneficiaries. They may also frustrate the efforts of change agents if they are not a part of it.

The end users of automated LISs should be able to make meaningful contributions and suggestions during the systems analysis phase that will guide and drive the process of software development. To do this, they need to have first of all acquired the skill and some level of competence in the use of computers which might lead to increased receptivity to these new ICT based products. However continuing in practice with an with an ICT deficiency introduced during their undergraduate years public sector practitioners are in urgent need of capacity building initiatives both from the government and the international community. Capacity building by way of skills transfer, software development and hardware are required to foster automated LIS systems in Africa

## **6. CAPACITY BUILDING IN THE PRIVATE SECTOR.**

Land and property professionals in private practice, continue to face ICT challenges in the delivery of their professional duties. Being in competitions with allied professions, the need to keep abreast with technology can not be over emphasized. In Nigeria today the banking industry has gone fully automated and professional valuers serving this industry are unable to keep pace with their professional counterparts in other professions. The reason for this is not farfetched and can also be traced to a weak foundation or no foundation at all depending on their year of graduation. This should not be an excuse because professional associations like the Nigerian Institution of Estate Surveyors and Valuers do not make light of their Continuous Professional Development (CPD) training.

Valuers serving the banking sector in the preparation of mortgage valuations, investment analysis or feasibility and viability studies should be able to perform these tasks matching the level of technological sophistication of their banking clients. CPD efforts should be channelled towards ICT as a matter of urgency including deadlines for compliance as much as possible so that the sustainability and relevance of the profession is sustainable.

The absence of dedicated professional software designed and developed for use within the Nigerian real estate; land administration and property management environment also contributes to the lack of interest in acquiring the technology. Imported professional software developed in different practice environments outside Nigeria; do not accurately reflect the local practice methods and so its users have to first of all understand the principles behind the software before it can be applied effectively with a lot of adaptation. This makes the process a bit cumbersome and discourages adult learners.

## 7. CAPACITY BUILDING IN THE CORPORATE SECTOR

Land management professionals in the corporate sector are probably in a more advantaged position than their colleagues in Academia; public sector; or private sector practice. The level of ICT awareness and use in the corporate sector is much higher. Exposure to internet facilities on a constant basis coupled with the availability of other relevant professional software is certainly an added advantage. However the issue of dedicated customised professional software is also a challenge for them and in most cases they have to make do with adapted alternatives.

## 8. CONCLUSION

From the discussions so far, this paper concludes as follows:

- Curriculum and instruction with special reference to Estate Management in higher institutions in Nigeria lacks sufficient content and context to provide undergraduates with sufficient grounding on ICT to enable them utilise the skills upon graduation. Lecturers are in urgent need of capacity building to enable them cope with the ICT age.
- University graduates absorbed in the private or public sector are unable to handle ICT challenges because of a weak foundation and the absence of focused career development programmes that adequately address the learning needs of mid-career professionals.
- The public sector lacks the infrastructure or capacity to provide on-the-job training in this specialist area coupled with the absence of indigenous software for use.
- The private sector land management professionals appear to be well ahead of their colleagues in terms of their ICT competence but also suffer the absence of indigenous software for use.

The need for GIS or automated land information systems in Nigeria and in the rest of Africa can not be overemphasized. There are already leading examples of geographic information systems in Nigeria like the Abuja Geographic Information Systems (AGIS) and the current efforts at automation in Accra – Ghana. The question of sustainability must however be addressed. At this time in our national development, all the four identified sectors academia; the public sector; private sector; and corporate sector would need to have an extensive audit done to ascertain their capacity building needs within the context of ICT. The results of such an audit should form the basis for the development of capacity building programmes designed for the land sector.

Future research in real estate (Dixon, 2005) must recognise the growing importance of ICT in real estate markets and real estate service provision because of the potential impact on value and the way in which services are provided. As a profession that is relevant to all these other professionals at work in the construction industry, there is an urgent need to remain at par with the rest of industry by a gradual shift from over dependence on traditional filing cabinets

and pocket calculators to the sophistication of computer technology. The time is now ripe for Estate Surveyors and Valuers to quit paying lip service to this all important issue and take on the challenge to see that within the next few years, practicing surveyors are fully trained and sufficiently literate to use computers in every aspect of their professional practice.

ICT has generally enhanced Real Estate practice but in Nigeria, there is room for improvement. A simple example is the use of mobile phones for communication via text messages which has helped improve communication in the course of everyday assignments. Field staff can make immediate contact with their home office of the Principal partner when issues arise while out in the field. In the past, such staff would have had to return to base to deal with such issues. The use of computers and the internet has also made it possible for firms to operate several branches apart from their Head Offices with more ease than previously was the case. Professional reports may be vetted online and the exchange of documented information has been greatly enhanced. Some of the general business applications programmes that are available on most operating systems such as windows are spreadsheets, databases, word processors and computer aided design programmes.

Although changing business conditions all around us motivate a request for new or improved computer system support, the first real step in this process is to recognize the need to change and clearly define what changes are needed. For this change to occur, some element of standardization of professional practice procedures is required. Real life problems can not be solved easily without proper diagnosis of problems and situations and the introduction of standards. For the professional firm or Government body that is contemplating computerization, the starting point is to do a systems analysis in the form of a feasibility study before a decision is taken on appropriate software to introduce.

In conclusion, I would like to say that the computerization process and the move toward automation at the national level is collective responsibility of the Estate Surveyors and Valuers Registration Board of Nigeria, The Nigerian Institution of Estate Surveyors and Valuers, Universities and other Higher Institutions as well as the individual Valuer as part of his/her personal continuous professional development efforts. Intervention at the international level is also required by way of infrastructure and capacity building.

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## **BIOGRAPHICAL NOTES**

Academic Qualification: B.Tech Estate Management, MSc Urban Land Appraisal –Reading University. 22 years lecturing, research and professional experience in Real Estate, Land Management and Sustainable Development. Current research focuses on Statutory Valuation and Sustainable development in Real estate processes.

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