

# Bologna and the MEng: 'Sleepwalking into unknown and unpredictable territory'<sup>1</sup>

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**Abstract** The background to the Bologna process is that there was considerable concern in the 1990s at governmental level in the EU nation states over economically unsustainable, grossly inefficient higher education systems. The Bologna process of three cycles of higher education, the first being the 'mobility degree' (Bachelors level) after three years of study, the second (Masters level) after a further two years of study, and a third cycle of postgraduate study as yet undefined, has received widespread agreement across now 45 nation states, and has gained worldwide interest. For certain sections of UK higher education, such as engineering, science, architecture and medicine, where the degree cycles do not fit with the Bologna cycles, the Bologna process presents significant difficulties. This paper explores those difficulties, and possible responses, none of which are themselves without difficulty.

**Keywords** Bologna process; engineering degrees; UK higher education

This article is based on a presentation given by the author to the Professors and Heads of the Electrical and Electronic Engineering Sectoral Group of the EPC Engineering Professors' Council (PHEE) at their annual conference in January 2005.<sup>2</sup> The author has taken a lead role in exploring the Bologna process on behalf of the Engineering Professors' Council (EPC), and has attended a number of meetings of the European Universities Association (EUA) on behalf of the EPC.<sup>3,4</sup> The views expressed here are solely those of the author, although there are a number of members of the EPC who share similar concerns to those expressed here.

The EPC's interest in Bologna goes back approximately four years, when it was obvious to EPC members that dramatic changes were afoot in Europe, but there appeared to be little or no engagement with the process from the UK. Three years ago, a senior representative from the UK government's Department for Education and Skills (DfES) came to an EPC meeting and gave us a series of palliatives over the Bologna process. One of our more ebullient members commented that 'you have been sent to stop the horses bolting, haven't you?' and he responded along the lines of 'I couldn't possibly comment!' As will be illustrated below, little has changed in the intervening period.

## The Bologna process

The background to the Bologna process is that there was considerable concern in the 1990s at governmental level in the EU that Italy, Germany, France and many New Accession States have economically unsustainable, grossly inefficient higher education systems. Also, that the European higher education system was not making a sufficient contribution to the wealth creation process in the EU, and that the EU

higher education system was hidebound and resistant to change. A very potted history of the Bologna story so far is as follows.

The Bologna process began in 1988, with the publication of the 'Magna Charta Universitatum'<sup>3</sup> which originated at the University of Bologna to celebrate the 900th anniversary of that university, the oldest in Europe. The charter simply called for an open, transparent, European HE system. Following the publication of the charter, there were various key stages to the process, which were:

*1998 The Sorbonne Declaration*<sup>4</sup>

This covered the harmonisation of European Higher Education, and was signed by France, Italy, Germany and the UK.

*1999 The Bologna Declaration*<sup>5</sup>

Most people think this was the start of the process because at that time the Declaration was signed by 29 nation states. The substance of the Bologna Declaration was simply that it reaffirmed the Sorbonne Declaration.

*2001 The Prague Declaration*<sup>6</sup>

This reaffirmed Bologna, and the Commission 'appreciated' role of the European Universities Association, which is the association of Rectors of European Universities (in the UK the equivalent body is Universities UK, known as UUK).

*2003 The Berlin Communiqué*<sup>7</sup>

This included the role of quality assurance in the Bologna process. It officially adopted the two-cycle degree process, and included the recognition of degrees and periods of study as defined by the European Credit Transfer System (ECTS).

*2005 The Bergen Declaration*<sup>8</sup>

This reaffirmed Berlin, and added a third cycle of degrees which are exclusively PhDs. It did not embrace EngD's etc, known as the 'professional doctorates'. In Europe there are no equivalents of the UK's 'professional doctorates', and their place in the Bologna process is still undecided. Bergen also included the notion of the 'Integration of the European Higher Education Area and the European Research Area', and posited the Bologna Process as the 'instrument to achieve the integration of the EHEA and the ERA'.

*2005 The Glasgow Declaration*<sup>9</sup>

This was largely concerned with 'refocusing the Bologna process midway to 2010'. Its banner headline was 'Strong universities for a stronger Europe', based on 'the knowledge society through higher education and research'. The manipulation of the Bologna process was thus to enhance research and innovation within Europe.

It should be emphasised that the Bologna process is not a European Union programme; membership is much wider than the EU, and the EU has only partial 'competence' (or constitutional power) over education matters. However, the EU is a principal stakeholder in the Bologna process, which is a commitment by 45

countries across Europe<sup>10</sup> to harmonise their systems and structures of higher education in order to create an integrated European higher education area (EHEA). 'Bologna' has now taken on an ever more important international role, as China, Latin America, Australia and Asian countries are now officially designated as 'Bologna Observers' and attend all meetings.<sup>11</sup>

I will next look to the details of the process, and in particular how it impinges on higher education predominantly within England and Wales, with occasional comments on the Scottish HE system.

### Three educational cycles

The Bologna principles are, on the face of it, quite straightforward. The devil is in the detail. Bologna calls for a transparent EU-wide system of degrees and definitions permitting wide exchange and collaboration of nation states, in three cycles as follows:

- The first cycle 'Mobility degree', comprising 180 ECTS, which on a time-served basis can be equated to 3 years, and is equivalent to the UK's Bachelors degree. Entry to the first cycle is based on national criteria.
- The second cycle degree, the Masters level, which is awarded after the achievement of 90–120 ECTS, i.e. 1.5 to 2 years of full-time study, with an absolute minimum of 60 ECTS, or one year. Entry to the second cycle is on *completion of the Bologna first cycle*.
- The third cycle, or Doctoral level degree, which is as yet undefined in terms of either timescale or ECTS. The EUA meeting at Salzburg in 2005<sup>12</sup> could not agree on either a timescale, although 3–4 years was generally discussed, or the number (or even if) ECTS should be used in the context of a third cycle degree, although some nation states already have this. Entry to the third cycle is on *completion of the Bologna second cycle*.

The difficulties with this process are encompassed in the statements in italics above. As the entry to first cycle degrees is on the basis of national criteria, then this is no problem. However, as entry to the second and third cycle degrees is by *completion of the previous Bologna cycle*, then if a national qualification is not recognised as Bologna compliant, as may happen to the British qualifications of MEng, MMath, MPhys and MChem, then candidates with these qualifications may find it difficult to gain admission to postgraduate degrees in European countries; UUK has evidence that this is already happening. This is the UK's particular problem area.

### Problem areas for the UK

The MEng etc. degrees are 'integrated four year undergraduate Masters degrees' – don't we make things difficult for ourselves? We all know why we called them 'undergraduate Masters': it was to obtain HEFCE (UK government) funding, but equally, we all knew that it was an unholy compromise at the time. It is now coming back to bite us. An 'undergraduate Masters' degree is a contradiction in terms which

few outside the UK understand. These degrees are clearly not 3 + 2 and so, on the face of it, do not qualify as Bologna second cycle degrees.

The ECTS again seems fairly straightforward: 60 credits = one full academic year. But does this mean 30 weeks or 46 weeks? I understand, from talking to a 'Bologna Promoter', that agreement has apparently been reached on a definition of 30 weeks, but it is going to be some time before this is confirmed in print. ECTS was/is a largely a 'time served' measure, which jars with a learning outcomes-based approach, as has been championed by the UK. There is a significant body of opinion within the Bologna signatories that learning outcomes need to be linked to standards, perhaps measured in time; ECTS's are being regarded in certain areas as becoming a 'volume' measure of learning outcomes. This is changing, and there is hope that changing to output standards and 'levels' can be accomplished by linking to the Dublin Descriptors, which are levels of attainment after first, second and third cycles.<sup>13</sup>

### **Economic competitiveness or pedagogy?**

Bologna started as academic process. But this has now been largely subsumed into 'In the lead by 2010', which follows from the Lisbon<sup>13</sup> and Barcelona<sup>14</sup> Declarations 'to increase the average research investment level from 1.9% of GDP today to 3% of GDP by 2010, *of which 2/3 should be funded by the private sector*'. At the Salzburg EUA meeting when this was reiterated, a main board director of a large multinational company stated that this was simply unrealistic, as industry would not be prepared to fund the gap. Five years later the targets have been re-examined and have now become 'aspirations'!

This linkage cannot be over emphasised; the EU's motivation is economic competitiveness, not pedagogy. The research investment gap between the EU and the other G8 countries is falling; the figures are as follows: in the US it is 2.7% of GDP and growing; in Japan 2.9% and growing; in the EU it is 1.9% and stagnant (falling?). The Framework Seven Programme<sup>15</sup> (FP7) budget has been heavily reduced to 1.7%. The European Research Council (ERC)<sup>16</sup> will probably start with a very low budget of 200 million euros, although apparently more has been promised. The European Technology Institute,<sup>17</sup> although opposed in most quarters, will go ahead in an underfunded, largely virtual manner. The whole process is failing before it starts.

Politically, within the EU there are the 'twin pillars' of:

- The European Research Area (ERA),<sup>18</sup> and
- The European Higher Education Area (EHEA)<sup>19</sup>

and Bologna is seen at the top level as the instrument to integrate the EHEA and ERA. This may look good to be able to piggyback academia on economic goals; however, it could also be bad, as the pedagogy could easily be lost in the economics.

The general climate within Bologna is similar to that of the EU constitution. The

political elite are moving far faster than the vice-chancellors, and vice-chancellors are moving faster than academics.

### Political difficulties

All this brings me to my sub-title, 'sleepwalking into unknown and unpredictable territory'. This refers to a statement made by Barry Shearman MP, Chairman of the UK Commons Select Committee on Higher Education, expressing his concern about the lack of clarity in the Bologna process at a recent meeting with the Engineering Professors' Council. On the other hand, the UK's Higher Education Minister, Bill Rammell MP, seems unperturbed by the Bologna process.

The political difficulties are manifold. The 3 + 2 + 3 process is seen as an 'Anglo-Saxon solution', i.e. British, and has been for at least 6 years, which of course is partly right and partly wrong. The epithet 'Anglo-Saxon' received wide media coverage when it was applied to the EU budget process in 2003; however, it had been used in the Bologna process for many years before that. Furthermore, output standards are also seen as another 'Anglo-Saxon solution', and 'Anglo-Saxon' standards are generally viewed in the rest of Europe as being low. Some nations, e.g. France, Germany, Italy and Spain, in moving from 5-year degrees to 3 + 2 degrees, have deep concerns as to what is the use of the first cycle degree. The 3-year PhD is also an anathema to many in EU countries where PhDs commonly take nine years to complete. It is also significant that a proportion of premier US universities are not accepting Bologna first cycle degrees as suitable for entry to PhD study. In 2005, the US National Academy of Engineering,<sup>20</sup> in their study *Educating the Engineer of 2020*, stated that 'the BS degree should be considered as a pre-engineering or "engineer in training degree", whereas the MS degree can be regarded as the engineering "professional degree"'.<sup>21</sup>

In the UK our engineering qualifications are accredited under the EC UK-SPEC,<sup>21</sup> which is explicitly Bologna compliant. The definitions are (my italics): 'Chartered Engineer' – an accredited Bachelors degree with honours in engineering or technology, plus either *an appropriate Masters degree accredited or approved by a professional engineering institution, or appropriate further learning to Masters level or an accredited integrated MEng degree*. It's the 'or' where we may get into trouble!

### Alternative strategies

As we appear to be in some difficulties with regard to the issue of whether the integrated Masters degrees, MEng etc. are Bologna compliant or not, a 'defence document' was produced by Universities UK, in collaboration with the Engineering Council UK (EC<sup>UK</sup>), and the EPC. Although the rebadging of the 'M' degrees as postgraduate degrees, which was one of the key points of this document, appears to have been adopted by HEFCE, there are problems, in my view, with the other partial solutions suggested.

The MEng at present is clearly not a 3 + 2 Bologna compliant degree. To award

both a BEng and an MEng degree emphasises the 3 + 1 nature of the award, which it was expressly stated not to be, when it was first introduced. We can no longer claim the MEng as an 'integrated Masters degree' as certain engineering institutions permit 3 + 1 for accreditation. These degrees are actually 4–1, i.e. an MEng with an exit route after three years, but this is a politically difficult point to argue in the rest of Europe. We cannot claim high input standards, but we can claim universal high level selection at Level 2. We used to be able to uniquely claim high output standards as defined by UK-SPEC, but the EU are moving to the same output standard descriptors now as the UK and so this weakens our claims in this regard.

A further strategy being explored in some higher education institutions in the UK is that of bolstering the MEng by adding in extra credits. For example, an extra 30 credits between levels 3 and 4, in the shape of a credit-bearing industrial placement, gives 90 credits i.e. the minimum for the award, but we need to be careful, as according to some definitions this may still only be 60 ECTS credits.

Another strategy is to bolt on a further 30 credits beyond the fourth year as an extended project, or a credit-bearing industrial placement. However, this to me seems to be a clumsy solution, as it delays the award of the degree. There are also fee and student debt implications for all of these strategies, which as yet do not appear to have been thought through. These strategies are all risky, and if one higher education institution breaks ground, others may all be forced to follow.

It is also perhaps worth noting at this stage that although many educational institutions in Scotland seem to believe that they are Bologna compliant with their five-year MEng, this is in fact not strictly true, as the Scottish BEng is a four-year degree, although it is supported by the SEFI (the European Society for Engineering Education). A further similar suggested work-around for the rest of the UK, by rebadging our Level 0 (Foundation Level) as the start of our degree programmes, and admitting 'A' Level students at the second level, falls at the same hurdle, as the BEng is then a four-year degree, and so BEng and MEng still do not add up to a 3 + 2.

A further reason why we need to be very careful with all these alternative strategies is that any admission of inequality between MEng degrees could have serious repercussions for international accreditation agreements. It could also have knock-on effects in FEANI (European Federation of National Engineering Associations)<sup>22</sup> and the members of the Washington Accord.<sup>23</sup> The UK is already under pressure with FEANI, as evidenced by the recent attempts to have UK degrees removed from the register. The implementation of the Bologna process is being monitored by the 'Trends' group of the EUA, and the BERGEN Trends IV<sup>24</sup> 'stocktaking' exercise concluded that: 'some fields of study remain outside the two cycle system in a number of countries: in particular, medicine and related fields, engineering, architecture and law . . . Universities in Belgium, the Netherlands and Sweden consider their 60 ECTS Masters, following a 180 ECTS Bachelors, as too short and not internationally competitive . . . In Ireland and Scotland a few examples of a move towards five-year integrated Masters programmes were also found, for example in nursing, midwifery, dentistry, medicine and in sciences and engineering while the model of a four-year 'Integrated Masters' also exists in the UK. It is difficult to see how this model in its present form could be integrated as a *second* cycle

qualification to the overarching European higher education qualifications framework'. The UK was also dealt a further blow when CESAER<sup>25</sup> (the Conference of European Schools for Advancing Engineering Education and Research) and SEFI<sup>26</sup> concluded that: 'The 3 + 2 model has become a standard reference in engineering. This should not exclude other possible paths towards the second-level degree, such as an integrated 5-year curriculum or a 4 + 2 or a 4 + 1 model'.

### **Bologna-compliant objectives?**

Are we perhaps confusing objectives here? Bologna is a mainstream academic process, applicable to all fields of study. In the rest of Europe a 'university' means high-level teaching and research. There are no 'non-research' universities, and third cycle degrees are seen as academic research and a necessary precursor for an academic career. In mainland Europe many view postgraduate education as primarily a precursor to employment as a member of the academic staff of a university, whereas in the UK the emphasis is different and we look to the majority of postdoctoral students to go into industry. Some Europeans see postgraduates with doctorates leaving universities to go into industry as a 'brain drain'!

Returning to the confusion, the problem areas identified above are: 'medicine and related fields, engineering, architecture and law'. These, it should be noted, are all professions. In addition, most academics in the EU do not have the same understanding of what in the UK is meant by 'professional accreditation'. Therefore, there is, it seems to me, a fundamental conflict between professional recognition in the UK, and the Bologna cycles. So should we play the 'professional exemption' card – medicine will, law will, why shouldn't we? Although it is readily recognised that this would give us political problems with FEANI etc.?

There may be some hope in the US National Academy of Engineering report *The Engineer of 2020*, which concluded that the 4-year Bachelors degree should be regarded as a preparatory degree for engineering. Why should we not define the MEng etc. degrees as 'professional' Masters degrees? They are all actually so already. We could justifiably claim that MEng etc. require fewer ECTS credits than a 'full 2-year Bologna compliant second cycle degree for research' because its purpose is professional practice, not research. Other factors supporting this approach are that international professional accreditation is much more mature than Bologna, and there is a partial precedent already in qualifications such as the 'professional doctorate EngD', which is an alternative to the traditional PhD providing a more vocationally oriented doctorate in engineering. By taking this route, the UK could then claim to be fully Bologna compliant. In more detail, this approach would require the following steps:

- No change to Bachelor's degrees, which are clearly Bologna first cycle;
- Declare the 2-year MPhil Masters degree as the UK Bologna compliant second cycle degree and as suitable for progression to research (MEng is a 'professional Masters degree', and stands alongside Bologna);
- Third cycle degrees are already largely Bologna compliant (the 'professional doctorate' EngD stands alongside Bologna);

- MEng candidates for the Bologna third cycle degree may be required to complete additional study (in the UK they could be registered for MPhil and change regulations after one year. Some universities do this already with Bachelors candidates for research degrees.)

### Possible ways forward

A recent EU Directive, *Delivering on the Modernisation Agenda for Universities: Education, research and innovation*, lists the following changes required in order to better align educational outcomes with the needs of the ‘knowledge society’:<sup>27</sup>

- A major effort should be made to achieve the core Bologna reforms by 2010;
- An EU Directive on the recognition of professional qualifications has made it simpler and quicker to have qualifications for professional practice recognised across national borders.

So now that 2010 is only three years away, what are the possible ways forward? Four possibilities suggest themselves:

*Plan A: to defend the notion of the current MEng as a second cycle Bologna degree.* This is problematic but vitally necessary, even though such an attempt may fail.

*Plan B: to bolster the MEng as follows, so that it complies with Bologna.* This could be done by

- adding an extra 30 credits: this is possible (being careful of definitions);
- adding an extra 60 credits: this is difficult in practice; there are fee problems and delays in awarding the degree.

A clear disadvantage however is that retaining two degrees emphasises the 3 + 1 structure. Another possible problem with this plan is that if one university goes down this route, all the others will need to follow, which will cause major structural upheavals for many universities.

*Plan C: to claim professional exemption.* A disadvantage with this approach is that there would be possible knock-on effects for established procedures for accreditation used by professional bodies such as SEFI, FEANI, and Washington Accord signatories. The UK already has difficulties with some of the Washington Accord signatories by requiring an MEng for CEng registration, and if this were seen as not Bologna compliant it would add to these difficulties.

*Plan D: a full five-year 3 + 2 Bologna compliant MEng.* Many academics favour this because it helps to maintain traditional standards; and counters the ‘maths and physics problem’ by being able to devote more study time in the first/second cycle to these subjects. However, there are major difficulties here with funding and top-up fees. Nevertheless, some very prominent figures in British academia are supporting this route.<sup>28</sup>

As will be clear from this summary, all the ways forward have difficulties. The Europe Unit of UUK<sup>29</sup> has been working tirelessly to find a way forward for the UK in this morass, and EC<sup>UK</sup> has also been constantly engaged behind the scenes. One

of the problems the UK has faced is that hardly any prominent university vice-chancellors have been engaged in the process. At the four EUA meetings I have attended, out of 350 or so delegates at each meeting, the UK has usually been represented by around 10–12 people. Only one vice-chancellor has shown up, and one registrar of a Welsh university has attended all meetings – therefore we are woefully underrepresented at the highest level. The UK now holds the chair of the Bologna Follow Up Group<sup>30</sup> for the next period, so vastly increased efforts by vice-chancellors, UUK and the DFES is needed in order to achieve some meaningful progress over the next few months, and so that we in the higher education sector can plan appropriately. Or are we going to continue to sleepwalk?

Finally, as is well recognised, the UK higher education system is chronically underfunded in comparison to our major international competitors: by around 30–50%, depending on the source chosen. In a recent press statement the UK Chancellor acknowledged this, but appears to see the way forward as de-regulating fees. In my view this is completely unrealistic. It is about time political parties of all colours recognised that if the UK wishes to be a key competitor in the knowledge economies of the 21<sup>st</sup> century, a properly funded higher education system with a professional cadre that is internationally competitive is central to such aspirations.

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