

# EDUCATION, KNOWLEDGE, COMPETENCE – FUNDAMENTAL PREREQUISITES FOR NUCLEAR SECURITY

**Slobodan Jovanovic**

University of Montenegro, Centre for Nuclear Competence and Knowledge Management  
Podgorica, Montenegro

Email: [bobo\\_jovanovic@yahoo.co.uk](mailto:bobo_jovanovic@yahoo.co.uk); [jogi@rc.pmf.ac.me](mailto:jogi@rc.pmf.ac.me)

## 1. Introduction

Successful implementation of international norms on the security of radioactive sources requires a number of prerequisites at the State – including the provision of adequate legal, institutional, financial, technical and human resources. Among the latter (HR), it is often taken for granted that necessary knowledge and competence do exist *per se*. However, this is not always the case, just the contrary – time, efforts and resources are frequently wasted because these HR fundamentals are not set solid at first [1,2].

## 2. Education as a Fundament for Safe and Secure Utilization of Radiation Sources – the Role of INSEN

Education and training are paramount in building knowledge and competence (Fig.1). It is crucial to recognize the importance of formal education, primarily at universities. IAEA based international nuclear security education network (INSEN), even not so long in existence, proved pivotal in the field [3,4]. Standardization of educational programmes and thoughtfully conceived development of textbooks/literature on key NS subjects turned out to be highly appreciated in Member States [4,5].

Especially small, developing, non-nuclear countries, starting their NS education from the scratch, are profiting from the network. Education at universities, preferably following INSEN guidelines, is thus fundamental for HR development in NS [5].

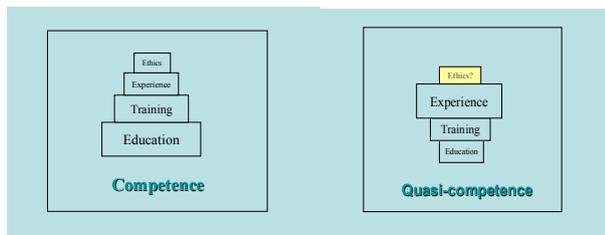


Fig.1 Education as the fundament of competence (left) and competence vs quasi-competence (right)

Training is another aspect of HRD, equally important – however quite different in nature from education. Another international network (Nuclear Security Support Centres – NSSC) deals, *inter alia*, with training aspects of competence [6].

While education basically stands for knowledge, training contributes to its practical applicability – both being essential constituents of competence. For competence to be complete, one should also include experience and ethics.

Training cannot replace education – attempting so, one falls into a typical competence pitfall. Training is thus meaningful only when superposed onto an adequate education. Messing up these terms will lead to a false perception of knowledge and competence (quasi-knowledge and quasi-competence); eventually/inevitably security will be jeopardized/compromised (Fig.1).

## 3. Experience and Ethics

The same is valid for experience. Although always welcome and respected, experience cannot replace neither education, nor training, not to speak both of them. Only on the top of the two, experience makes sense and gives a fine touch of maturity to competence.

Ethics is perhaps the least questioned among competence ingredients – it is also often taken for granted. Without going into elaboration, it is enough to think of a knowledgeable, trained, experienced and malevolent person at a responsible position somewhere in nuclear sector – a serious security issue per definition.

## 4. Some Pitfalls to Beware

Quasi-knowledge and quasi-competence are more perilous for NS than ignorance and incompetence (i.e. clear lack of knowledge and competence), because the latter are more explicit and easier to recognize/prevent/rectify.

It is important to note that quasi-knowledge and quasi-competence can be traced behind nearly all nuclear mishaps – from minor/benign incidents (like just clumsy handling of some situations in nuclear community, e.g. poor communication with public/media), to major accidents with grave consequences.

## 5. Conclusion

All aspects of competence should thus be properly addressed – education, training, experience and ethics – with adequate place and emphasis for each.

Briefly: there are very few things which can contribute so beneficially to security like knowledge and competence; there are even less of those which can cause so much harm as the false perception of them.

## 6. References

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY, Knowledge Assist Mission to Montenegro, 2-4 Sept. 2009, End-of-Mission Report, IAEA-605-L2.33.7-MNE, 2010-06-16.
- [2] UNIVERSITY OF MONTENEGRO, “University Centre for Nuclear Competence and Knowledge Management”, Establishment Elaborate, Podgorica (2008).
- [3] INTERNATIONAL ATOMIC ENERGY AGENCY, International Nuclear Security Education Network (INSEN), [www-ns.iaea.org/downloads/security/insen-overview2012.pdf](http://www-ns.iaea.org/downloads/security/insen-overview2012.pdf)
- [4] INTERNATIONAL ATOMIC ENERGY AGENCY, Educational Programme in Nuclear Security, IAEA Nucl. Security Series No. 12, Vienna (2010), [www-pub.iaea.org/MTCD/publications/PDF/Pub1439\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub1439_web.pdf)
- [5] UNIVERSITY OF MONTENEGRO, Faculty of Math. and Nat. Sciences, Accredited Educational Programmes (in Montenegrin), Podgorica (2012) [www.pmf.ac.me/index.php?page=InformacijePrikaz&tip=aktuelnost\\_fakultet&id=4f2f2b68af1f6](http://www.pmf.ac.me/index.php?page=InformacijePrikaz&tip=aktuelnost_fakultet&id=4f2f2b68af1f6)
- [6] INTERNATIONAL ATOMIC ENERGY AGENCY, International Network for Nuclear Security Training and Support Centres (NSSC), [www-ns.iaea.org/security/nssc-network.asp?s=9&l=76](http://www-ns.iaea.org/security/nssc-network.asp?s=9&l=76)