THE INTEGRATION OF INDIAN INDIGENOUS KNOWLEDGE INTO THE SOUTH AFRICAN LIFE SCIENCES CURRICULUM

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ABSTRACT – This paper sheds light on the integration of Indian Indigenous Knowledge in the current South African Life Sciences school curriculum. The national curriculum requires the inclusion of indigenous knowledge from different cultures, yet no guidance is stipulated in curriculum documents, neither do textbooks provide much insight that teachers and learners can draw on. Despite the fact that Indian people represent a minority group, there are a significant number of Indian learners in South African schools. Indian indigenous knowledge is rooted in ancient practices such as Ayurveda and this indigenous knowledge should be integrated together with African and European indigenous knowledge in the school curriculum. Teachers need rigorous pedagogical content knowledge (PCK) about indigenous knowledge systems to enable integration. In this qualitative interpretive study, we used purposive sampling among Life Sciences teachers attending a short course on indigenous knowledge to determine their views and experiences on incorporating indigenous knowledge (especially Indian indigenous knowledge) in the Life Sciences classroom. Data collection included the Views of the Nature of Indigenous Knowledge questionnaires, other questionnaires focusing on Indian indigenous knowledge and individual interviews. The emerging themes from this research are (a) despite poor indigenous knowledge among teachers, they see its integration in the science curriculum as beneficial, and (b) teachers' pedagogical content knowledge for integration of indigenous knowledge is weak, and professional development is needed to empower teachers for such epistemological border crossing. We argue from an embodied, situated and distributed cognition perspective how such integration of indigenous knowledge could enhance Indian students' learning in Life Sciences.

Keywords: indigenous knowledge; Ayurveda; Pedagogical content knowledge

1. INTRODUCTION

The South African education system has undergone several curriculum changes since 1994 when apartheid was dismantled. The present Curriculum and Assessment Policy Statement (CAPS), first implemented in 2012, is content-laden with an emphasis on a transmission mode of teaching rather than skills and learning by inquiry as was the case of the previous curriculum, OBE. Coupled with this, South Africa has regrettably been ranked in the bottom three countries globally for achievement in Mathematics and Science in the Trends in Mathematics and Science Study (TIMSS) assessments (TIMSS, 2015), lending voice to the dire need for transformation in these curricula especially. One of the principles of CAPS states that Indigenous Knowledge Systems (IKS) are to be valued by "acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution" (DoE, 2011, p.5). However not enough about IKS is included in the school Life Sciences curriculum to realize this principle. Odora-Hoppers (2005) favors the inclusion of IK into university curricula to get Africa "to find its voice, heal itself, and reassess its true contributions to global cultural and knowledge heritage" (Houtondji, 1997; Visvanathan, 1997 in Odora-Hoppers, 2005) but Indigenous Knowledge should also be more systematically integrated into school curricula.

Presently, CAPS includes aspects of Indigenous Knowledge but focuses on African Indigenous Knowledge only despite the Life Sciences CAPS documenting that the examples of Indigenous Knowledge chosen "for study should, as far as possible, reflect different South African cultural groups" (DoE, 2011,p.17). In SA, a multi-cultural country, the Indigenous Knowledge of minority groups are therefore completely excluded, forming a gap in school curricula. This paper then, firstly aims to show

that the Indigenous Knowledge of the Indian minority group in SA should be integrated into the Life Science curriculum. This will portray the value of Indigenous Knowledge of different cultures thereby playing a role in transformation and nation-building while expecting to improve the performance of Indian learners in Life Sciences. However teachers need to have the pedagogical content knowledge (PCK) to be able to integrate Indian Indigenous Knowledge into their Life Sciences lessons. This is in turn, dependent on whether teachers receive adequate guidance and preparation during their teacher education courses. To qualify this statement, Kibirige & Van Rooyen, (2006, p.237) believe that "it is the responsibility of higher educational institutions to prepare teachers for the implementation of Indigenous Knowledge in the science classroom." The second aim of this paper is therefore to highlight how teachers currently teach Indigenous Knowledge in the curriculum with specific reference to Indian Indigenous Knowledge.

2. THEORETICAL AND CONCEPTUAL FRAMEWORK

The over-arching grand theory of constructivism will be used to frame this study. This theory considers that an individual makes meaning of a reality that exists "out there" (Lee, 2011). This is relevant to our research because children come to the classroom with traditional, everyday knowledge (which Vygotsky refers to as spontaneous concepts) they have grown up experiencing. Including this everyday knowledge in science lessons (where the focus is on scientific concepts) can make it more relevant for learners, easier to relate to and perhaps improve performance in Life Sciences. The Cultural Historical Activity Theory (CHAT), devised originally by Vygotsky and modified by Engeström (2011) into a third generation activity theory is grounded in constructivism and will be used to identify any tensions that teachers may have in the integration of Indian Indigenous Knowledge into the curriculum.

CHAT as a theoretical lens will be used to view intermediate concepts relevant to this study, i.e. generic indigenous knowledge systems (IKS) with reference to Indian Indigenous Knowledge; teachers' pedagogical content knowledge (PCK); the nature of science (NOS) which in turn gives rise to the nature of indigenous knowledge (NOIK) (Cronje, De Beer & Ankiewicz, 2015). Since Indigenous Knowledge refers to learners' everyday knowledge, the concept of embodied, situated and distributed cognition will also be explained.

2.1 Constructivism and CHAT

Constructivism suggests that each individual perceives reality according to their own experiences as opposed to the realism theory of knowledge which regards reality as existing independently to the perceptions of any individual (Von Glasersfeld, n.d). One type of constructivism is social constructivism which regards individuals as being interconnected with society and with each other through conversation (Ernest, n.d). Duran, et al. (1998,p.312) share the view that "social constructivists claim that meaning is constituted through a variety of social practices, especially through language which is a primary mediator." One of the foremost social constructivists was Vygotsky (1978) who believed that children use society to help them communicate to make their own meaning and that this in turn would allow them to develop individual cognition (Rogoff, 1990). This paper looks at indigenous knowledge which is formed as a result of social interaction over many generations using language as one of the means of transmitting knowledge. Odora-Hoppers (2005,p.1) regards language as "perhaps the most formal of human meaning systems" that a society can share. It is therefore apt to use social constructivism as the grand theory framing this study. Vygotsky (1978) explained that learning takes place on two levels: firstly on a social level, through interaction with others, and then on a personal level, where the socially constructed knowledge is

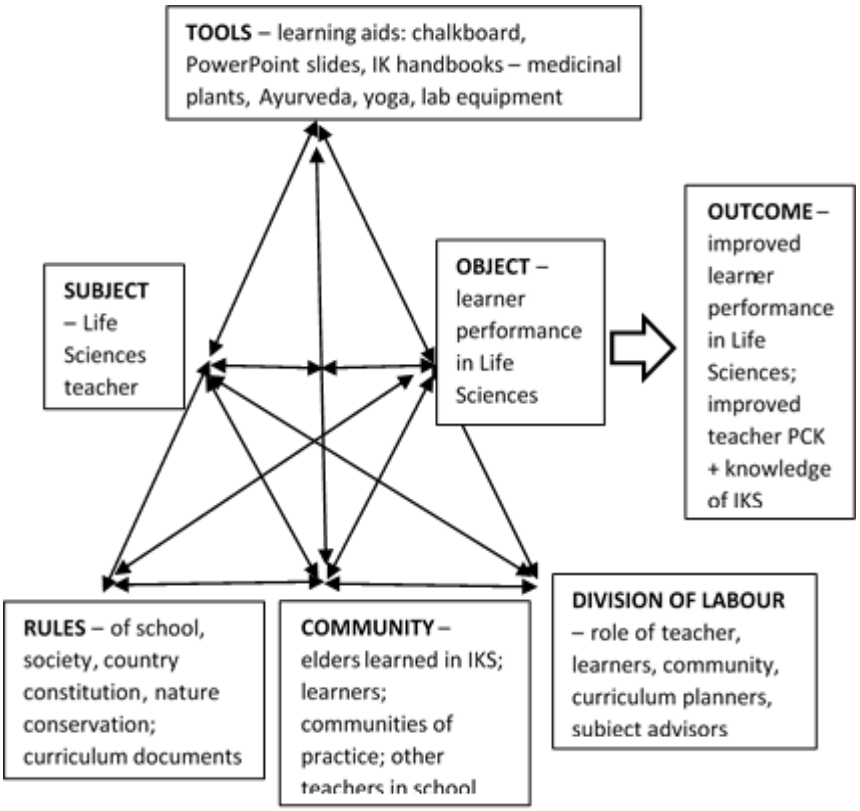

Figure 1: Activity System of the integration of Indian IK into the Life Sciences curriculum: How CHAT highlights tensions

internalized. This is very true of indigenous knowledge holders, where cooperative learning is center-staged (De Beer & Mentz, n.d.).

The third generation activity theory formulated by Engeström (2011) has six aspects inter-connected with multi-directional two-way arrows to show the dynamic interplay between each aspect in order to achieve an outcome (Hardman, 2008). This study, to appreciate the integration of Indian IKS into the South African Life Sciences curriculum, involved the interaction of several aspects as shown by the activity system in Figure 1. The intended OUTCOME of the activity system is twofold: to improve learner performance in Life Sciences and to enhance the Life Sciences teachers' PCK together with their knowledge of Indian IKS. This outcome was envisioned to be reached by the Indian Life Sciences teacher as the SUBJECT whose existing PCK and beliefs may determine how IKS is taught with the aid of TOOLS such as language to communicate, the standard teaching resources listed in the activity system, as well as engaging pedagogies, in order to influence the OBJECT which is the Life Sciences learner performance, and, what Gibbons (2000) calls Mode 2 knowledge production.

This needs to be achieved within the RULES of the school, community (if it is predominantly made up of a certain cultural group), constitutional rights of the multi-cultural learners, the requirements of the CAPS curriculum, while also abiding by the rules of nature conservation and sustainability in gathering samples. Of special concern here are also the tenets of the nature of science, and the tenets of the nature of indigenous knowledge.

The Life Sciences teacher belongs to a COMMUNITY that can also influence the outcome. This community consists of elders learned in Indian IKS, other teachers in the school or other schools in the area (communities of practice), and the learners. The five aspects mentioned also contribute to a DIVISION OF LABOUR to achieve the outcome. The teacher's role is to teach and incorporate Indian IK into Life Sciences lessons and perhaps be guided by curriculum planners and subject advisors who

should support and encourage the development of teachers towards IKS. Learners need to learn as active participants during lessons while they are supported by their families and communities in recognizing the value of IKS. Each of these six aspects will be further expanded on in the ensuing sections.

2.2. Indigenous Knowledge Systems (IKS)

According to Aikenhead and Ogawa (2007, p.554) "Indigenous peoples, …, are the descendants of the first people to inhabit a locality, who self-identify as members of a collective…. ,and who wish to perpetuate their cultural collectiveness." Based on this explanation, several groups of indigenous people can be identified globally, for example, First Nations people of Canada, Aborigines of Australia, African people in all parts of Africa and the Indians of India. McKinley (2007), cited in the same publication, identifies three type of indigenous peoples, one of which denotes "those who have been displaced from the locality from which they once drew their cultural self-identity" (id). This can apply to the Indians who were brought to South Africa from India as indentured labourers to work in the sugar-cane plantations during the 1800's and have since developed a large community in South Africa. According to Statistics SA, by 2011, Indians constituted almost 2.7% of SA's population (1 300 000).

Indigenous people have their own knowledge system referred to as Indigenous Knowledge (IK) which can be defined in many different ways: for example, it "is local knowledge derived from interactions between people and their environment," "it is a form of traditional wisdom," (Kibirige & Van Rooyen, 2006,p.237). Odora-Hoppers (2005,p.2) explains IKS as the "sum total of the knowledge and skills which people in a particular geographic area possess, and which enables them to get the most out of their natural environment." Onwu and Mosimege (2004,p.2) mention that "IKS are local, community-based systems of knowledge… unique to a given culture or society and have developed as that culture has evolved over many generations of inhabiting particular ecosystem." These definitions show that IK is holistic knowledge where various aspects of life can be integrated into a common knowledge largely dependent on the ecology of the area which the indigenous people have been occupying for many generations.

One of these aspects of life is healing the body which relates to the topics of human physiology and anatomy in the Life Sciences curriculum. It is relevant to Indian traditional knowledge, Ayurveda, that is an integral part of "Ancient Hindu spirituality" (Bhagwan, 2012,p.233) and forms the focus of this paper. Green (2008) states that Ayurveda is one of "three principal systems of Indian traditional medicine." According to Das (2015, para.1) "Ayurveda can be defined as a system, which uses the inherent principles of nature, to help maintain health in a person by keeping the individual's body, mind and spirit in perfect equilibrium with nature."This emphasizes the holistic nature of indigenous knowledge- also a trademark of African IK. Apart from treating particular conditions, Ayurveda is therefore also used to prevent them from arising at all.

The premise for Ayurveda is that just as the universe is made up of five elements (air, water, fire, earth and ether), the body has three corresponding doshas (energies), viz. Vata, Pitta and Kapha (id). These three doshas need to always be in a state of balance to ensure good health of mind, body and spirit. Any imbalance may result in disease or illness and will require specific Ayurvedic treatment in the form of nutrition, lifestyle and even exercise (Das, 2015; Angeletti, 2015). Ayurveda is thought to have originated nearly 6000 years ago in ancient India with rudimentary documentation in the Vedas (ancient Indian scriptures on wisdom) and "contains a series of prescriptions to help humans overcome certain ailments" (Das, 2015). Examples of some Ayurvedic treatments for a few common aliments are found on Table 1 (http://www.sanskritimagazine.com/vedic_science/medical-science-ancient-india/)

Table 12. Table showing a few Ayurvedic treatments

Ayurvedic plant	Scientific name	Health benefits
Triphala (mixture of 3 plants	*Emblica officinalis*,	Anti-oxidant and immune-enhancing properties. Used in

– amla, myrobalan (Harada) and belleric myrobalan (Bihara) – fruits are dried and then powdered together)	*Terminalia chebula* and *Terminalia belerica*	treatment of infections caused by drug-resistant pathogens, diabetes and recurrent rhinitis.
Guggul	*Commiphora mukul*	Arthritis, hemorrhoids, and urinary tract infections. Guggul is also publicized as a remedy for acne, as well as a weight-loss stimulant.
Fenugreek	*Trigonella foenum-graecum*	Type 2 diabetes, arthritis, inflammation, alopecia, muscle pain, gastrointestinal disorders, and skin ulcers
Turmeric	*Curcuma longa*	Stimulates digestion, boosts liver function, and regulates menstruation; can help prevent cancer; arthritis; eczema; heartburn; ulcers, gallstones; kidney stones.

Many plants used in Ayurvedic treatments are found in almost every Indian kitchen where they are used as ingredients in cooking. If Indian IK (Ayurveda) was known more extensively then more people can be exposed to these commonly available remedies to enhance health and well-being and prevent certain conditions from developing. Hence a need to include Indian IKS into school curricula. In the activity system, IKS form a dynamic inter-relationship between the teacher (SUBJECT) who needs to have sufficient knowledge about IK, the RULES of ensuring no destruction of nature when teaching IKS, the COMMUNITY with elders who know about IKS and the subject advisors guiding the implementation of the curriculum with integration of IKS (DIVISION OF LABOUR).

2.3. Pedagogical Content Knowledge (PCK)

PCK was coined by Shulman (1986) and it refers to teachers' subject matter knowledge, the skill of how to teach it to learners so that they understand the content; and the ability to use resources or improvise when resources are unavailable to enhance this understanding. Teachers need to enhance their PCK to integrate IKS into their lessons. If teachers are not motivated to direct their own learning to achieve this to become better teachers then this would lead to tension within the activity system and learning will not be effective – OBJECT of improving learner performance will not be achieved easily.

2.4. Nature of Science (NOS)

Scientific literacy is important amongst the populace of a country so that they can be well-informed about the environment, their health and technological developments around them (Vhurumuku, 2011). This can be achieved if learners are taught and have understanding of the NOS at school. This can be achieved if teachers have adequate training in the NOS during their teacher education, thus avoiding any negative tension in the activity system. The NOS has seven tenets that are directly relevant to school science: science is empirically-based; there is no single scientific method; there is a difference between a law and a theory and between observation and inference; scientific knowledge is tentative yet durable; it is theory-laden but partly subjective; it is socially and culturally embedded (Vhurumuku, 2011; Cronje, et al, 2015). The last tenet listed is especially relevant to IKS which also stems from social and cultural interactions. According to Abd-El-Khalick et al (2004), if students are taught science using the inquiry method, they will have a better understanding of the scientific process which in turn will make understanding of topics such as IKS easier to grasp and accept rather than perceiving it to be based in myth and "old wives' tales."

2.5. Nature of Indigenous Knowledge (NOIK)

In order for IKS to be integrated successfully into the curriculum it needs to also be regarded as being based in scientific principles. According to Le Grange (2007) "universalists…argue that modern Western science is superior to indigenous perspectives on the natural world," a notion that needs to be dispelled by elevating IKS to the same level as western science. This would then facilitate integration into the curriculum. Cronje et al. (2015, p.322) have summarised the following as the tenets of the NOIK: IK is empirical and metaphysical in nature; resilient yet tentative; inferential yet intuitive; creative and mythical; subjective; social, collaborative and cultural; wisdom in action; with a functional

application and a holistic approach. These tenets of the NOIK have similarities with those of the NOS while at the same time maintaining the uniqueness of each knowledge system (id). Both the NOS and the NOIK are significant in integrating IKS into the Life Sciences curriculum. Teachers should also have sufficient knowledge about the NOIK which will contribute to their PCK and enhance the integration of IKS into the curriculum. Due to the shared tenets between science and indigenous knowledge, such border-crossing could be easily facilitated by a teacher with appropriate PCK.

2.6. Embodied Situated Distributed Cognition (ESDC)

Refers to a paradigm of learning where cognition is deeply embedded within a person's mind while depending on interactions from artefacts around them as well as social interactions (Hardy-Vallee & Payette, 2008 in Ramnarain, n.d). The integration of IKS into the curriculum will depend to a large extent on the principles of this paradigm since IKS, like ESDC, is regarded as knowledge accumulated over many generations from social interactions within cultures as well as with various traditional remedies (artefacts). As mentioned above under the NOS, the inquiry method of learning science should be used (Khalick, et al, 2004) in order to ease the integration of IKS into the science curriculum and will in turn enable learners "to merge their anthropological experiences of the socio-cultural world with physiological experiences of the physical world…." (Ramnarain, n.d). ESDC is important in the integration of Indian IKS into the Life Sciences curriculum to allow Indian learners to relate to what is being taught since they will find it relevant to the everyday knowledge that they have grown up with. In the activity theory, this may then contribute to achieving the OUTCOME of this study, viz. improved learner performance in Life Sciences.

3. METHOD

The method used in a research study is guided by a research design which links the philosophical framework with specific data-gathering methods. (Creswell & Plano Clark, 2007). Each of these will be explained in the ensuing sections.

3.1. Methodology and Research Paradigm

This study is framed theoretically by constructivism and a CHAT lens. A qualitative interpretive research paradigm was therefore used to collect evidence from teachers who have their own perceptions about the teaching of Life Sciences to include IKS. This is also mentioned by Niewenhuis (in Maree, 2014) who explains that qualitative research entails an understanding of the processes and social and cultural contexts underlying different behaviours while mostly answering the "why" questions. This research was undertaken to look at why Indian IKS should be included in the Life Sciences curriculum, thus justifying the need to use a qualitative research method. The interpretive aspect of this method was obtained by soliciting teachers to complete questionnaires that asked about how they felt about issues such as the integration of IKS and its benefit to learners, the NOS and Indian IKS – specifically Ayurveda. See Addendum A for questionnaire.

3.2. Sampling and Data-gathering Techniques

A purposive sampling strategy was used to select participants in this study. This type of sampling is consistent with a qualitative research methodology. A group of eleven Indian male and female Life Sciences teachers were selected to answer a questionnaire (Appendix A). The teachers have between 5 and 22 years of experience teaching Life Sciences in various schools around Gauteng and KwaZulu-Natal, where the Indian population is mostly concentrated in South Africa. These teachers were selected because they were Indian and it was necessary to gauge their knowledge of traditional Indian Indigenous Knowledge and whether this influenced their teaching of Life Sciences. This purposive selection of participants adds to the validity of the study. Internal validity was enabled by having the questionnaire scrutinized by senior academics in the relevant fields (Maree & Van der Westhuizen, 2014, p37). The questionnaire comprised twelve questions and was disseminated via email on aspects such as their views of IKS, particularly Indian IKS. Their responses were coded and analysed as they were received since according to Niewenhuis (in Maree, 2014), purposive sampling is most successful

when data review and analysis are done concurrently with data collection. As is generally the case in qualitative research the sample size was small but flexible in that it continues until no new themes emerge, thus also achieving data and theoretical saturation (p.79). Comparison was made with the questionnaire responses from other teachers who attended a three-day Short Learning Programme (SLP) on IKS in Life Sciences. It must also be mentioned that this study was the first phase in a broader research project and served as an exploratory investigation.

3.3. Ethical Issues

Written permission was obtained from the teachers via e-mail. They were assured of their privacy and confidentiality at all times of the study. In the written consent to participate in this study, the respondents acknowledged that they were doing so on a purely voluntary basis and that they could withdraw at any time from the research. Appropriate feedback will be given to them on the outcomes of the investigation once it is completed.

3.4. Data Analysis Method

There are two approaches of qualitative data analysis and coding: an inductive and a deductive approach (Nieuwenhuis, p.99 in Maree, 2014). An inductive approach is unstructured, where the data is described and analysed according to themes that emerge as the analysis proceeds; while a deductive approach is where codes and themes are pre-set before data collection such that the description and data analysis will be forced into these pre-existing categories (id). Since this study has a qualitative research focus, an inductive method was used. The coding method described by Saldana (2009) was used by assigning descriptor codes to the responses from each questionnaire. These codes were then grouped into categories and these were in turn grouped into emerging themes. The coding process was guided by the focus of this paper which is to find out from teachers why IKS should be integrated into the Life Sciences curriculum and whether teachers have adequate PCK to implement such an integration together with an adequate knowledge of the NOS to facilitate this integration.

4. Results and Discussion

Seven questionnaires were received from Indian teachers and the responses analysed as described in 3.4 above. Ultimately, four themes emerged from all the questionnaires analysed.

Theme 1: Teachers acknowledge the value of indigenous knowledge systems to society, health and learner performance in Life Sciences

This theme emerged from comments such as "……it presents reflection of knowledge our ancestors adapted … to overcome illnesses, diseases and increased their living – life span;" "Very valuable …as learners will be afforded the opportunity to learn about other cultures and appreciate their own IKS;" "I see it as a storehouse of knowledge that is very unique to a culture and has been passed down for centuries. I believe that this store house of information, if properly tapped might provide solutions to many of our current problems."

Theme 2: Many teachers assume that they have knowledge of indigenous knowledge systems (and especially Indian indigenous knowledge systems)

Two of the teachers responded that "Ayurveda is the use of traditional Indian or Chinese medicine;" "Ayurveda is the use of natural products to promote a healthy lifestyle." The first response indicates a misconception that Chinese medicine is part of Ayurveda while the second comment does not even acknowledge Ayurveda as belonging to a cultural group.

Theme 3: Teachers acknowledge that they have an underdeveloped PCK of the nature of science, and the nature of indigenous knowledge.

One of the teachers responded that the NOS is "often accepted by most people whilst ayurvedic knowledge is accepted by few people. NOS could be seen as the right way. Ayurvedic knowledge could

be seen as a myth." Another teacher said that she was "not sure "what she understood about the NOS but ventured "Possibly that science has to be natural and always in touch with nature." Therefore, if the NOS is not understood then the NOIK will also be unclear, leading in turn to a weak PCK for the integration of IKS into the classroom.

Theme 4: Teachers have an under-developed PCK to teach Ayurveda in the Life Sciences curriculum
According to one teacher, "Ayurveda health is the balanced and dynamic integration between our environment, body, mind and spirit," which is a fairly accurate understanding of Ayurveda. However, the same teacher then responded that there are no links between Ayurveda and Life Sciences, thus indicating an inability to associate the two fields in the classroom.

The themes indicate that the teachers are willing to include indigenous knowledge into their pedagogy, however they may not have the skill or content to do so. Content knowledge is lacking since text books do not offer much information on indigenous knowledge. Since the teachers were willing to incorporate Indigenous Knowledge into their teaching, it indicates there was no tension in the activity system between the subject (teacher) and object (learner achievement in life sciences) to achieve the intended outcome (improved learner performance). However, the division of labour should be investigated further as the curriculum support is currently inadequate. Curriculum documents need to be improved and revised so that Indigenous Knowledge from other cultures is included in the curriculum and textbooks, and subject advisors should provide more guidance to teachers on the inclusion of indigenous knowledge in CAPS topics. This would also refer to the inclusion of Ayurveda into the curriculum so that Indian Indigenous Knowledge can become part of what learners study. This would then contribute to giving Indian learners a sense of pride in their heritage as a minority group in South Africa, thus enhancing their interest and performance in Life Sciences.

The responses of the teachers selected indicated that the nature of science and nature of Indigenous Knowledge is not clearly understood, thus impeding pedagogy and in turn learner performance. The nature of science and of indigenous knowledge should also be made more explicit in Life Sciences curriculum documents, as well as in pre-service teacher education.

CONCLUSION AND RECOMMENDATIONS

This study set out to investigate the integration of Indian IK into the South African Life Sciences curriculum by analyzing questionnaires from a group of Indian Life Sciences teachers. It emerged that the respondents all fully supported the integration as they regarded Indian IKS to benefit learner performance in Life Sciences; the well-being of the individual, society and nature. However, they lacked the PCK and knowledge of both IKS and Indian IKS to enable this integration successfully. They also lacked thorough knowledge of the NOS for learners to understand that IKS can be accepted just as scientific concepts are.

The recommendations from this study for the way forward are therefore to encourage universities to include IKS as a module in their teacher education courses, thus equipping teachers to incorporate IKS smoothly into their lessons. Indian IKS should make up part of this module so it will allow teachers to use examples of IKS from different cultural groups in South Africa including the minority Indian culture. This recommendation ties in to Gibbons (2000) Mode 2, context-sensitive science where he describes a transformation from Mode 1, context-free science. Mode 2 is a more interactive kind of science that "produces socially robust knowledge" (p.3) because of the two-way communication between science and society. In Mode 1, it was more one-way with science alone communicating with society. According to Gibbons (2000,p.5), "Universities are now operating in a social environment which values research…to play a greater role in what research is carried out and how" which makes it possible for IKS to be included in teacher education courses.

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APPENDIX A: QUESTIONNAIRE – INTEGRATION OF INDIAN IK INTO THE SOUTH AFRICAN LIFE SCIENCES CURRICULUM

How many years have you been teaching Life Sciences for?

Are you CAPS Trained for Life Sciences FET phase?

How do you see Indigenous Knowledge?
Do you think there is a place for Indigenous Knowledge Systems in the Life Sciences classroom? Why/Why not?
Have you ever incorporated Indigenous Knowledge into your Life Sciences lessons?
If so, explain what pedagogy you will use when teaching Indian Indigenous Knowledge. E.g. When looking at Indian medicinal plants, a teacher might decide to engage the learners in chromatography or in using agar plates to test anti-microbial properties.
What are your views on the teaching of Indian Indigenous Knowledge amongst Indian learners in South Africa?
The Life Sciences CAPS document states that the examples of IK chosen "for study should, as far as possible, reflect different South African cultural groups" (DoE, 2011:17).
Are you in a position to implement this requirement?
What problems do you experience when implementing this requirement?
What do you know about Ayurveda?
Would you say there are any links between the current Life Sciences curriculum and Ayurveda? Explain further.
How do you think the performance of Indian learners who learn about Indian Indigenous Knowledge would be influenced compared to those learners who do not learn about it?
What do you understand about the Nature of Science (NOS)?
Do you see any difference between the NOS and Ayurvedic principles? Explain your response.